



RESOLUTION

**APPROVING THE 2022 RECOVERY PLAN OF THE HONOLULU AUTHORITY FOR
RAPID TRANSPORTATION TO BE SUBMITTED TO THE FEDERAL TRANSIT
ADMINISTRATION**

WHEREAS, the Honolulu Authority for Rapid Transportation (HART) has been established pursuant to Article XVII of the Revised Charter of the City and County of Honolulu 1973 (Amended 2017 Edition) ("Charter" or "RCH"); and

WHEREAS, on December 19, 2012, the City and County of Honolulu ("City") and the Federal Transit Administration ("FTA") entered into a Full Funding Grant Agreement ("FFGA") for the Honolulu Rail Transit Project ("H RTP"), wherein FTA agreed to provide \$1.55 billion in New Starts funding for the construction of the H RTP, a 20-mile, 21-station rail project from East Kapolei to Ala Moana Center; and

WHEREAS, Section 17-103.1 of the Charter grants HART the "authority to develop the fixed guideway system"; and

WHEREAS, in 2016, the FTA requested that HART submit a Recovery Plan as a condition of its continued provision of New Starts funds pursuant to the FFGA; and

WHEREAS, HART has accordingly submitted Recovery Plans to the FTA on April 28, 2017, September 15, 2017, November 19, 2018, and June 7, 2019; and

WHEREAS, the Recovery Plan submitted to the FTA on June 7, 2019, was approved by the City Council by Resolution 19-115, CD1, on June 5, 2019, and by the FTA on September 5, 2019; and

WHEREAS, on December 23, 2021, the FTA requested that HART submit a revised Recovery Plan by June 30, 2022; and



RESOLUTION

WHEREAS, the HART Board of Directors formed a Permitted Interaction Group ("Group") on December 16, 2021, to investigate the development of a revised Recovery Plan; and

WHEREAS, the Group reported its recommendations to the HART Board of Directors on April 21, 2022; and

WHEREAS, on April 22, 2022, the HART Board of Directors adopted Resolution 2022-4, which approved the inclusion in the Recovery Plan of a truncated FFGA-funded Honolulu Rail Transit Project to the Civic Center Station and attendant amendment to the FFGA, the deferral of the Pearl Highlands Parking Garage; and

WHEREAS, on April 29, 2022, HART Executive Director and CEO Lori Kahikina submitted a draft 2022 Recovery Plan to the Board of Directors that incorporated the recommendations as set forth in Resolution 2022-4 (the "2022 Recovery Plan"); and

WHEREAS, on April 29, 2022, HART Executive Director and CEO Lori Kahikina provided advanced copies of the draft 2022 Recovery Plan to the Honolulu City Council for their review and consideration; and

WHEREAS, on May 6, 2022, the HART Board approved HART's draft 2022 Recovery Plan; now

BE IT RESOLVED by the Council of the City and County of Honolulu that the Council approves the HART Board approved 2022 Recovery Plan; and

BE IT FURTHER RESOLVED that HART is authorized to execute other documents the FTA may require in connection with or related to the HART Board approved 2022 Recovery Plan; and



CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII

No. 22-127

RESOLUTION

BE IT FINALLY RESOLVED that copies of this resolution be transmitted to the Mayor, the Executive Director and Chief Executive Officer of the Honolulu Authority for Rapid Transportation, the Federal Transit Administration, and to other agencies as may be necessary.

INTRODUCED BY:

Radiant Owens (br)

DATE OF INTRODUCTION:

MAY 18 2022

Honolulu, Hawai'i

Councilmembers

2022 RECOVERY PLAN

JUNE 30, 2022



HART

HONOLULU AUTHORITY for RAPID TRANSPORTATION

Lori M.K. Kahikina, P.E.
HART Executive Director and
Chief Executive Officer

Date

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Executive Summary

ES-1 Introduction

On December 19, 2012, the Federal Transit Administration (FTA) and the City and County of Honolulu (City) signed a Full Funding Grant Agreement (FFGA) providing for federal funding of the Honolulu Rail Transit Project (Project) under the FTA Capital Investment Grant program. The Honolulu Authority for Rapid Transportation (HART) is the semi-autonomous public transit authority responsible for the planning, development and construction of the Project, a 20-mile, automated fixed-guideway rail system with 21 stations extending from East Kapolei to Ala Moana Transit Center.

HART submitted a 2018 Recovery Plan, updated in May 2019, to the FTA that was approved on September 5, 2019. However, several key events occurred in late 2020 and early 2021 that contributed to the need for this updated 2022 Recovery Plan, including:

- Termination of the procurement of a Public-Private Partnership (P3) – The 2018 Recovery Plan was developed around the strategy of awarding a P3 contract for the construction of the City Center Guideway and Stations segment of the Project. That procurement was terminated in November 2020.
- Increase in Project costs – During the evaluation of the P3 proposals, in October 2020 HART announced an updated Estimate at Completion (EAC) of \$9.13 billion, an increase from the previous EAC of \$8.299 billion. This increase in the expected Project costs resulted in a funding shortfall for the Project, based on the forecast funding at that time.
- COVID-19 – The economic impact of COVID-19 was significant in Hawai'i, as it was to the rest of the world, with tourism to the State effectively coming to a standstill. Much of the Project funding is through local General Excise Taxes (GET) and Transient Accommodations Taxes (TAT), both of which were negatively impacted by the pandemic. In addition, the pandemic resulted in delays to the construction schedule.
- Leadership – At the end of 2020, HART's Chief Executive Officer's (CEO) contract was not renewed. In January 2021, an Interim CEO was named to take over the leadership of the Project.

Due to the impact of these events on the Project, this revised 2022 Recovery Plan is being submitted to the FTA.

ES-2 Request for Truncation of the FFGA Project Scope

In this document, HART will provide information on its plan to deliver a safe, reliable, and functional rail transit system to the City. Fundamental to being able to deliver such a system is the financial capacity available to HART to fund the planning and construction of the remainder of the Project.

The Project is a 20-mile automated fixed guideway rail system, with 21 stations, stretching from East Kapolei to the Ala Moana Transit Center. As mentioned above and discussed more fully in this document, the current estimated Project costs exceed the forecast funding currently available to the Project, thereby resulting in a projected funding shortfall. HART is confident that the current funding sources, including the federal funding to be provided under the FFGA, will be sufficient to complete the Project at least as far as the Civic Center Station. HART is also confident that it will be able to complete the next phase of the Project to Ala Moana Transit Center using future local and/or other funding outside of FTA Capital Investment Grant program funds.

As more fully described in Section 2 of this document, in order to deliver a functional rail system within the currently estimated funding available, HART is requesting that the project scope for purposes of the federal funding and HART's contractual obligations under the FFGA (also referred to as the FFGA scope) be truncated to establish an interim terminus of the rail system at the Civic Center Station, located at the corner of Halekauwila Street and South Street in Honolulu. This location is two stations and is approximately 1.25 miles short of the current FFGA terminus at the Ala Moana Transit Center. A temporarily truncated FFGA scope, with an interim terminus at the Civic Center Station, supported by an enhanced City bus network, will provide a functional rail system. HART and the City are committed to completing the project as originally contemplated in the FFGA to the Ala Moana Transit Center as a separate phase to the project as sufficient funding become available.

In addition, HART is requesting that the construction of the Pearl Highlands Parking Garage be deferred from the FFGA scope. HART proposes building a planned access ramp from the H-2 freeway and a bus transit center at the Pearl Highlands Station, but in this phase of the Project, excluding the 1,600-stall parking garage.

HART's plan steadfastly remains to build the rail system to the Ala Moana Transit Center. Upon truncation of the FFGA scope, HART understands that the remaining Project funding for the cost of the route from the Civic Center Station to the Ala Moana Transit Center and the Pearl Highlands Parking Garage must be provided by non-FTA Capital Investment Grant program funds. HART will continue to evaluate and pursue cost reductions, risk mitigation opportunities, and additional funding to complete the Project to the Ala Moana Transit Center.

ES-3 Estimated Project Costs

As discussed in Section 4, a further revision to the EAC was announced in March 2021. In concert with that announcement, internal cost reduction opportunities, including risk mitigation actions and value engineering workshops, were pursued.

The current EAC for the full scope of the Project to the Ala Moana Transit Center is \$10.459 billion, plus estimated Project financing costs of \$850 million. With the truncated FFGA scope, as described above, the EAC will decrease to \$9.148 billion, plus estimated financing costs of \$785 million, resulting in a total estimated Project cost of \$9.93 billion.

In October 2021, as recommended by the FTA, HART engaged a consultant (Triunity, Inc. or Triunity) to conduct an independent cost and schedule assessment. The costs used in this Recovery Plan are based on the results of the independent assessment released in December 2021, unless indicated otherwise.

The Triunity report, titled “HART Program Cost Estimate & Schedule Assessment”, is included as Appendix C.

ES-4 Project Funding and Financing

The estimated funding available for the truncated FFGA scope is discussed in Section 3. Local funding comprises 83 percent of the total forecast funding, while federal funding comprises 17 percent of the total. State GET and TAT represent most of the local funding. In 2021, an additional source of funding, a City TAT, was allocated to the Project by the Honolulu City Council.

ES-5 Management Capacity and Capability

In 2021, HART reduced its organization considerably. This was done at a time when construction activity was at a slow point, the P3 procurement had been canceled, the west-side work was winding down and the City Center Utility Relocation (CCUR) contract was terminated. Decisions to reduce staff were based on several factors, including identified inefficiencies and redundancies, job responsibilities that were not deemed to be crucial at this point of the Project, and individual performance. Both HART and consultant staff were affected.

Key positions that needed to be replaced were identified and recruiting ensued to fill those positions. Most key positions have been filled; however, recruiting continues for some of the remaining open positions. HART is pleased and confident in the quality of its current staff.

As directed by the FTA, the PMOC conducted a Management Capacity and Capability (MCC) review in October 2021 and issued a report in December 2021 (attached to this document as Appendix D). HART appreciated the constructive comments and recommendations that were documented in the report and interpreted the results of this review to be positive overall. HART is committed to addressing the PMOC’s recommendations and to hiring qualified candidates for open positions.

A continuing challenge for the Project has been hiring and maintaining experienced rail transit and construction staff. Major contributing factors to this challenge include limited transit-specific expertise in Hawai‘i, coupled with Honolulu’s remote location 2,400 miles from the continental U.S., and its status as one of the most expensive cities in the country in which to live. This situation was compounded through the COVID-19 pandemic.

Section 8 discusses HART’s project management organization, leadership team, PMOC MCC review, and other staffing matters.

ES-6 Key Changes Since 2018 Recovery Plan

The following are the key changes from the previous Recovery Plan:

- A truncation of the FFGA Scope is being proposed for the portion of the Project funded through the FTA Capital Investment Grant program.
- The Project costs, schedule, and funding estimates have been updated.
- A new funding source, the City TAT, was secured.
- The P3 procurement was terminated.
- The Indefinite Delivery Indefinite Quantity (IDIQ) utility relocation contract was canceled.
- Designs and approvals are being completed prior to the utility relocation work; and
- A new management team was formed.

ES-7 Recovery Plan Summary

HART, with the support of the Mayor, City Council, HART Board, and the City's Department of Transportation Services (DTS), is proposing to truncate the FFGA scope to provide for an interim terminus at the Civic Center Station and to defer the Pearl Highlands Parking Garage. The currently forecast funding is sufficient to cover the costs of the proposed truncated FFGA scope, resulting in a fundable and functional system for its intended purpose. HART intends to complete construction of the Project to Ala Moana Transit Center in a future phase, using funding sources outside of the FTA Capital Investment Grant program funds.

1 Project Status

During 2021 and thus far in 2022, significant progress was made in key areas of design, construction, and project management. In addition, the following analyses and project planning activities were performed in collaboration with the FTA and PMOC, the results of which are incorporated into this Recovery Plan document, as applicable:

- Completed revision of the HART Project Management Plan and functional sub-plans.
- Independent Cost and Schedule Assessment (performed by Triunity, Inc.).
- Coordinated industry Peer Review Assessment.
- Management Capacity and Capability Review (performed by PMOC).
- Performed internal risk assessment.
- Conducted value-engineering workshops; and
- 2022 Risk Assessment (performed by PMOC).

1.1 Project Description

The Project, as currently defined in the FFGA, is a 20-mile grade-separated automated fixed rail system from East Kapolei to the Ala Moana Transit Center. Among other specifics, the scope includes 21 stations, 80 light-metro fully automated (driverless) rail vehicles, a Maintenance and Storage Facility (MSF) on a 44-acre parcel near Leeward Community College, and four park-and-ride facilities with 4,100 total parking spaces. The park-and-ride facility at the Pearl Highlands Station will be a parking garage (the “Pearl Highlands Parking Garage”) with a planned 1,600 parking stalls, which includes the construction of an access ramp from the H-2 freeway and a bus transit center.

As discussed further in Section 2, HART is requesting a truncation of the FFGA scope to establish an interim terminus at the Civic Center Station and to defer the Pearl Highlands Parking Garage.

The Project, excluding park-and-ride facilities, is currently separated into three operating segments, as follows:

- Operating Segment 1 – West Side Stations and Guideway: East Kapolei Station to Aloha Stadium Station.
- Operating Segment 2 – Airport Guideway and Stations: Aloha Stadium Station to Middle Street Transit Center.
- Operating Segment 3 – City Center Guideway and Stations: Middle Street Transit Center to Ala Moana Transit Center.

If HART’s request for a modification of the FFGA scope is acceptable, Operating Segment 3 will end at the Civic Center Station, and a fourth operating segment would address the final 1.25 miles of guideway, the Kaka’ako Station and the Ala Moana Center Station in a separate phase of the Project.

1.2 Construction Status

Overall, the construction of 15.5 miles of the guideway structure – 75 percent of the entire route – from East Kapolei to Middle Street (Operating Segments 1 and 2) has been completed. Additionally, the first nine stations and the MSF have been completed and the next four stations are each more than 72 percent construction complete. To date, 72 out of 80 total rail vehicles have been delivered.

1.2.1 Operating Segment 1 – West Side Stations and Guideway (WSSG)

Construction in the first operating segment is complete, including the first 9 stations, 10 miles of guideway and track, and the MSF, along with related infrastructure. Testing and Commissioning is approximately 95 percent complete as of April 2022, the last 5 percent of testing will be completed during Trial Running.

Two recent track-related issues in Operating Segment 1 have been resolved:

- (1) In late 2020, it was discovered that there was a misalignment of the wheels and rails in the double-crossovers due to the wheels being too narrow. It was determined, based on a study and recommendation by an independent industry expert, Transportation Technology Center Inc. (TCCI), that a weld repair of the double-crossovers would be an appropriate interim solution as the wheels are replaced over a period of time. The weld repairs were completed in April 2022.
- (2) It was also recently discovered that the track gauge in certain areas of the track crossovers was too tight. The tracks have been adjusted and the gauge issue has been resolved.

After the completion of systems integration testing by the Core Systems Contractor (CSC), Hitachi Rail Honolulu Joint Venture (HRHJV), Trial Running will begin and will continue for a minimum of 90 days, including a demonstration of 98.5 percent system service availability averaged over a 30 consecutive day period. On completion of successful system service availability, HART expects to transfer Operating Segment 1 to DTS for revenue service in the fourth calendar quarter of 2022.

1.2.2 Operating Segment 2 – Airport Guideway and Stations (AGS)

Construction of the guideway superstructure in Operating Segment 2 is complete and the track-work is expected to be complete by June 2022. As of April 2022, the four stations in this segment range between 72 percent and 84 percent construction complete and are expected to be finished in the fourth quarter of 2022. Core Systems work will commence in the fall of 2022. Trial Running and the transfer of Operating Segment 2 to DTS is expected in the first quarter of 2025. Once the transfer of Operating Segment 2 is complete, 75 percent of the entire guideway and 13 of 21 total stations will be operational.

1.2.3 Operating Segment 3 – City Center Guideway and Stations (CCGS)

The City Center segment currently refers to the segment of the Project beginning east of the Middle Street Transit Center, proceeding along the very congested Dillingham Boulevard to the Iwilei community, and then proceeding through downtown to the Ala Moana Transit Center. As discussed further in Section 2, HART is proposing a truncated FFGA scope to have an interim terminus at the Civic Center Station. If the truncated FFGA scope is approved, a fourth operating segment from the Civic

Center Station to the Ala Moana Transit Center would be completed in a separate phase, subject to the availability of funding.

The utility relocation work along Dillingham Boulevard is the critical path to the completion of the entire Project, making it crucial that this work is fully designed before construction begins and efficiently proceeds with the necessary work once designs are approved.

A City Center Utility Relocation (CCUR) project was awarded in 2018 as an IDIQ contract. In early 2021, this contract was canceled, and further design work commenced. The HART Executive Team directed the Engineering team to finalize the utility relocation design plans strictly adhering to City Design Standards and gain necessary approvals from all City agencies and third-party utilities before proceeding with another construction procurement contract.

The utility relocation designs and approvals for the area from the Iwilei Station to Ala Moana Transit Center were 100 percent complete in June 2021. A Request for Bids (RFB) was issued, and a contract was awarded in January 2022, for the utility relocations for the area from Iwilei to Ward Avenue, which is just east of the Civic Center Station and is a practical junction for the phasing of the utility relocation work. A limited Notice to Proceed was issued in April 2022, with the physical work expected to begin in June 2022. The utility relocations in the area from Ward Avenue to Ala Moana Transit Center will be performed in a subsequent phase of the Project.

In April 2022, the final design stage was completed for the utility relocations along Dillingham Boulevard, the critical path for the Project, and the procurement was initiated. It is anticipated that the Dillingham Boulevard utility relocations will be completed in 2026.

In conjunction with the utility relocations and the subsequent guideway construction on Dillingham Boulevard, a decision was made in 2021 to shift a portion of the guideway route to the “mauka” (or mountain) side of the street. This plan is referred to as the “Mauka Shift”. The Mauka Shift will significantly reduce the scope of the utilities that need to be relocated in that area and will also eliminate the need for many straddle-bent columns in that section of roadway. The result of these changes is a reduction in the schedule by approximately six months and estimated cost savings of \$165 million.

The procurement package for the CCGS construction is under development and a Request for Qualifications is expected to be issued in the fall of 2022. Construction of the guideway will likely begin at the Civic Center Station location and proceed westward toward Dillingham Boulevard while the utility relocation along Dillingham Boulevard is being completed. The final 1.25 miles of guideway from the Civic Center Station to the Ala Moana Transit Center, the final two stations, and the Pearl Highlands Parking Garage will be addressed in a separate phase of the Project.

2 Truncation of FFGA Project Scope and Functionality of System

The current FFGA scope of the Project is summarized in Section 1, the primary component of which is a 20-mile elevated guideway and 21 stations, from East Kapolei to the Ala Moana Transit Center.

Despite efforts by HART and the City to reduce the Project costs and secure sufficient additional funding, the Project as defined in the current FFGA is not constructible within the revised budget. Accordingly, HART is proposing a truncation of the FFGA scope to (1) deliver a rail system that meets the Purpose and Need of the Project; (2) construct as much of the Project as possible within the currently forecast funding that is immediately available for the Project; and (3) utilize both the federal and local taxpayer-provided funding in the most cost-effective way possible.

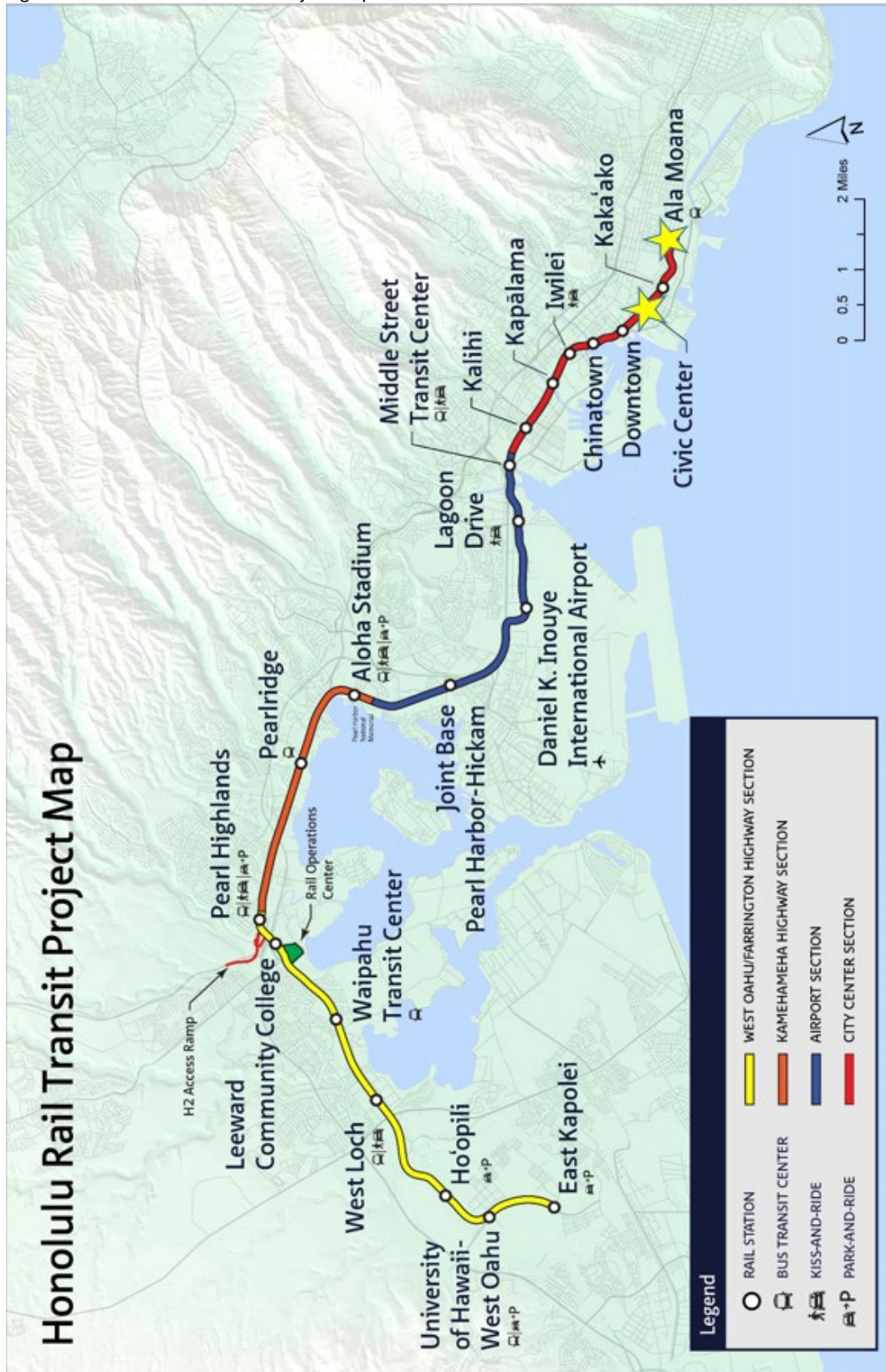
HART is committed to completing the Project, including the final two stations, to the Ala Moana Transit Center, in a subsequent phase. However, based on the information above, HART is proposing a truncated FFGA scope as follows:

- Establish the Civic Center Station as the interim terminus of the Project, for purposes of federal funding and HART's contractual obligations under the FFGA. This station location is 1.25 miles and two stations short of the Ala Moana Transit Center.
- Defer construction of the Pearl Highlands Parking Garage. This is a 1,600-stall parking facility that was planned to be adjacent to the Pearl Highlands Station. HART proposes to defer the parking garage but to continue construction of the planned access ramp from the H-2 freeway and the bus transit center.

The proposed truncated FFGA scope includes 18.75 miles of guideway of the originally planned 20 miles or almost 94 percent of the route, and 19 of the originally planned 21 stations. HART believes that the truncated FFGA scope, in conjunction with enhanced bus services to complement the truncated scope, meets the original Purpose and Need of the rail system and provides a fully functional transit system to the City and County of Honolulu.

Figure 2-1 presents a map of the entire route of the Project from East Kapolei, the westernmost station, to the Ala Moana Transit Center. The map also identifies the Civic Center Station, which will be the interim terminus under the truncated FFGA scope. HART fully intends to complete the remaining guideway and stations to the Ala Moana Transit Center in a separate phase of the Project, subject to available funding outside of the FTA Capital Investment Grant program funds.

Figure 2-1: Honolulu Rail Transit Project Map



2.1 Delivery of a Functional System – Purpose and Need

The Purpose for the Project and the Need for Transit Improvements as stated in the Final Environmental Impact Statement (FEIS) are as follows:

Purpose of the Project

The purpose of the Honolulu Rail Transit Project is to provide high-capacity rapid transit in the highly congested east-west transportation corridor between Kapolei and UH Mānoa, as specified in the Oʻahu Regional Transportation Plan (ORTP) (Oʻahu MPO 2007). The Project is intended to provide faster, more reliable public transportation service in the study corridor than can be achieved with buses operating in congested mixed-flow traffic, to provide reliable mobility in areas of the study corridor where people of limited income and an aging population live, and to serve rapidly developing areas of the study corridor. The Project will also provide additional transit capacity, an alternative to private automobile travel, and improve transit links within the study corridor. Implementation of the Project, in conjunction with other improvements included in the ORTP, will moderate anticipated traffic congestion in the study corridor. The Project also supports the goals of the Honolulu General Plan and the ORTP by serving areas designated for urban growth.

Need for Transit Improvements

There are several needs for transit improvements in the study corridor. These needs are the basis for the following goals:

- *Improve corridor mobility*
- *Improve corridor travel reliability*
- *Improve access to planned development to support City policy to develop a second urban center*
- *Improve transportation equity*

The proposed truncated FFGA scope of the Project will continue to deliver the positive benefits of the rail system and meet the Purpose and Need of the Project, as stated above.

- Under the truncated FFGA scope, the guideway follows the same route as stated in the FEIS and FFGA, with the only difference being that it temporarily stops 1.25 miles short of Ala Moana Transit Center. This truncation of scope will enable the Project to achieve its stated purpose, within its current forecast of funding, while still providing the opportunity to extend the project to the Ala Moana Transit Center and, ultimately, to the University of Hawaiʻi (UH) at Mānoa, as contemplated by the ORTP.
- The proposed interim terminus at the Civic Center Station is beyond the most congested areas in the east-west transportation corridor referenced in the FEIS and extends eastward beyond the heart of downtown Honolulu.

- The guideway is an elevated structure, except for a 0.6-mile at-grade section near Leeward Community College. The guideway will achieve faster, more reliable service than can be achieved with buses operating in congested streets.
- The route, which is not changing, will provide for reliable transportation in areas of limited mobility, low income, and an aging population. The areas that would predominately fall into these categories are on the western side of O‘ahu and along Dillingham Boulevard. These areas remain in the service area of the Project.
- Providing service to rapidly developing areas continues to be achieved with the truncated FFGA scope. There are areas along the entire route in which development has already begun or for which plans are actively being established, including areas in the Ewa plain, around Aloha Stadium, and along Dillingham Boulevard. The area between the Civic Center Station and the Ala Moana Transit Center, which will be outside the proposed truncated FFGA scope but within the overall Project plan, is also a developing area. An enhanced bus service, as more fully described in Section 7 of this document, will be provided in this area to accommodate rail passengers and to help mitigate the impact of a temporarily truncated system. This area has access to additional transit options through a bike-share system, designated bike lanes, and sidewalks that will provide access to the Civic Center Station.
- The opening of the rail system to the interim Civic Center Station terminus will provide a valuable and needed transportation alternative and will provide greatly expanded transit capacity to Honolulu, with an expected 84,000 daily boardings in the first year of full operation. Additional information on ridership projections is provided later in this section and in Section 7.

The components of the Need for Transit Improvements, as described in Section 1.8 of the FEIS, are also met with the truncated FFGA scope:

- **Improve Corridor Mobility.** In describing the need for improved mobility, the FEIS referenced congestion and delays on the H-1 freeway and the related impact on motorists traveling from West O‘ahu to downtown. The rail system, with the proposed truncated FFGA scope, will provide the same enhanced mobility option for the areas discussed in the FEIS. The truncated scope does not alter the route of the guideway from East Kapolei, along the H-1 freeway, and through downtown Honolulu. The ability of the rail system to address this need, as described in the FEIS, is undiminished.
- **Travel Reliability.** With the opening of the rail system, the reliability of transit is expected to improve substantially as commuters will now have the option to move from private vehicles and long-haul buses, operating in mixed traffic, to a grade-separated right-of-way rail system. In addition, bus service reliability is expected to improve as routes are restructured to be shorter, local, and integrated with the rail stations.
- **Access to Planned Development to Support City Policy to Develop a Second Urban Center.** The second urban center that has historically been discussed is the area of Kapolei. The rail system will continue to connect East Kapolei with downtown Honolulu. Additionally, the access

provided by the rail system to many areas of current and planned development along the rail route will not be affected.

- Improve Transportation Equity. Transportation equity is an important priority of HART and the City. The need to address transportation equity may be more important now than at the time the Project commenced due to ongoing cost increases of personal automobiles, fuel, and parking, not to mention ongoing congestion on our roadways. Currently, the predominant options for travel along much of the rail route are bus or automobile. The rail system will provide a much-needed, accessible, and affordable transportation option for Honolulu, particularly in the areas of West O‘ahu and along Dillingham Boulevard.

2.2 Deferral of Pearl Highlands Parking Garage

The Pearl Highlands Parking Garage has been a significant component of the Project, as a link to the rail system for residents of Central O‘ahu and the North Shore.

The proposed deferral of the parking garage is based on the following data points:

- The estimated cost of the Pearl Highlands Parking Garage is \$330 million. The planned parking garage consists of 1,600 parking stalls, which translates to a cost of approximately \$206,000 per parking stall. HART discussed the cost of constructing a parking garage with a national construction company, who advised that a national average cost of a similar garage would be approximately \$40,000-\$60,000 per stall. A reputable, local developer in Honolulu advised that a parking garage was recently constructed in Honolulu at a per-stall cost of \$35,000-\$45,000. The estimated per-stall cost of the Pearl Highlands Parking Garage warrants further evaluation.
- The significant cost of this parking garage is largely due to its location – the foundation of the structure is designed within the footprint of an existing flood plain resulting in very poor soil conditions. The poor soil conditions and an existing stream at that location require expensive foundations that span aerially “over” the stream since HART cannot build the facility “in” the stream. This, coupled with utility relocation needs and occasional flooding during rains, increases the construction schedule risk which all add to the overall costs of the parking garage.
- Considering the current estimated cost of the parking garage, if the parking garage is not deferred, HART is not confident that currently available funds would be sufficient to complete the guideway to the Civic Center Station. HART has decided to prioritize completing the guideway to at least the Civic Center Station, while plans for the parking garage are further investigated.
- Impact on rail ridership as a result of deferring the parking garage is not anticipated to be significant. The deferral of the parking garage is estimated to reduce total daily riders in the first year of full operations by 1,500, or approximately 1.7 percent. Ridership impacts are more fully discussed in Section 7.

- DTS has revised plans for enhanced bus services to Central O‘ahu and the North Shore to provide additional access to the rail system at the new Pearl Highlands Transit Center.

The proposal to defer the parking garage will allow further opportunities for HART and DTS to jointly evaluate options for addressing the rail access needs of the residents of Central O‘ahu and the North Shore in a more efficient and effective way.

2.3 Bus-Rail Interface

As mentioned above, DTS plans to provide enhanced bus services between Central O‘ahu and the North Shore, and the Pearl Highlands transit station. In addition, DTS plans to expand rapid and high-capacity bus service in downtown Honolulu to provide service to rail passengers arriving and departing via both the Downtown Station and the Civic Center Station. Two new express bus routes would connect the Civic Center and Downtown rail stations to the Ala Moana Transit Center, UH Mānoa, and Waikīkī. These new enhanced bus services will match the peak and mid-day frequencies of the rail service. Together, these bus routes will offer a combined headway with service every 2 minutes between the Civic Center Station and the Ala Moana Transit Center. A more detailed discussion of bus services is included in Section 7.

2.4 Impact on Ridership

In the first full year of operation, with the positive impact of the enhanced bus-rail integration plan described above, ridership on the rail system under the truncated FFGA scope is expected to be about 84,000 weekday riders, about 16,600 fewer boardings, or 16.5 percent, than ridership under the original FFGA scope. The deferral of the Pearl Highlands Parking Garage is estimated to result in a reduction of overall system-wide daily ridership by about 1,500 boardings, relative to an alternative that includes the parking garage, or about a 1.7 percent decrease. Additionally, the truncated FFGA scope with the enhanced bus services is estimated to result in 262,700 daily linked bus-rail trips island-wide, about 3.7 percent fewer linked trips than in the original FFGA scope, but an increase of almost 60 percent over 2019 levels. These impacts to ridership are anticipated to be temporary, as HART still plans to complete the Project to Ala Moana in a subsequent phase.

A more detailed discussion of ridership is included in Section 7.

3 Funding

This section discusses the funding expected to be available to complete the truncated FFGA scope.

While HART is requesting that the FTA approve a truncated FFGA scope to contractually establish an interim terminus at the Civic Center Station, HART's goal for the Project remains to build the rail system to Ala Moana Transit Center. Upon FTA approval of the truncated scope, HART understands that the remaining Project funding for the cost of the route from the Civic Center Station to the Ala Moana Transit Center and the Pearl Highlands Parking Garage must be provided by non-FTA Capital Investment Grant program funds. HART also understands that funds dedicated to the completion of the truncated FFGA scope should not be diverted to other portions of the Project. HART will continue to explore cost reductions, risk mitigation opportunities, and additional funding to complete the full Project to the Ala Moana Transit Center.

3.1 Project Funding Summary

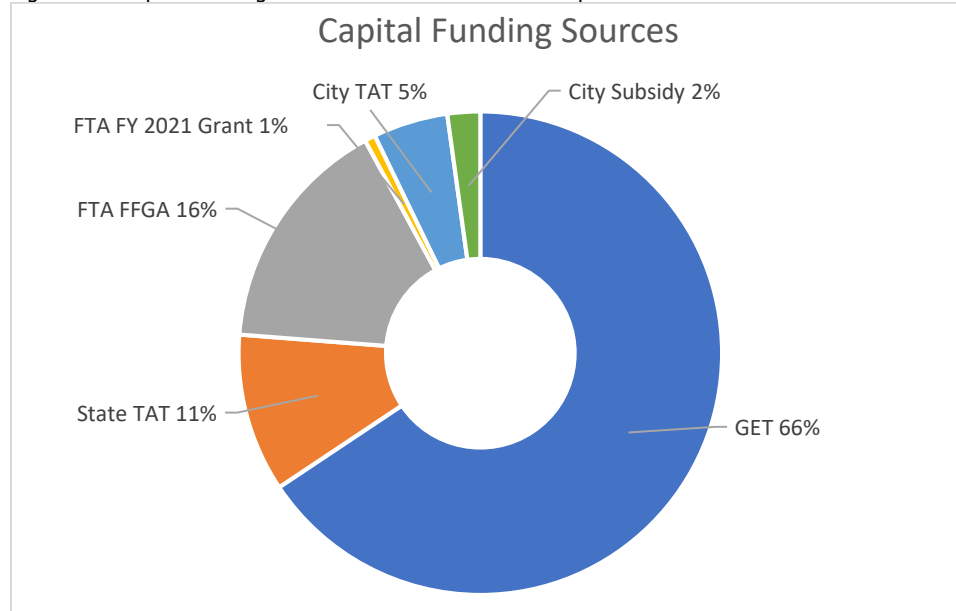
As shown in Table 3-1, the Project's funding for the truncated FFGA scope is provided by six primary sources, each of which is described in more detail later in this section.

Table 3-1: Summary of Project Funding

Project Funding Sources	(millions)
FTA FFGA	\$1,550
FTA FY 2021 Grant	70
General Excise Tax (GET)	6,390
State Transient Accommodations Tax (State TAT)	1,101
City Transient Accommodations Tax (City TAT)	488
City Subsidy	214
Total Funding Sources	\$9,813

The relative contributions from each of the funding sources are illustrated in Figure 3.1. Overall, 17 percent of the currently forecast Project funding is from federal sources (the FFGA funds and the FY 2021 grant) while 83 percent is provided by local funding, with GET being the predominant source of local funding (66 percent of total funding).

Figure 3-1: Capital Funding Sources for Truncated FFGA Scope



3.2 Federal Funding

In 2012, the FFGA was executed between the City and the FTA that provided \$1.550 billion to the Project, subject to Congressional appropriations. Between the federal fiscal year 2012 and federal fiscal year 2017, Congress appropriated the entire \$1.550 billion to be allocated to the project. To date, \$806 million of this federal share has been provided to HART, leaving a remaining balance to be funded of \$744 million. HART last received federal funds in the calendar year 2017.

HART respectfully requests that FTA approve the truncated FFGA Scope, as well as provide the remaining \$744 million to the Project to accomplish the truncated FFGA Scope. Such approval will provide a path forward for the completion of a fully functional rail system that is safe, reliable, meets the Project's intended Purpose and Need, and can be delivered within the projected available funding. Access to the balance of the FFGA funds is critical to overall Project funding.

In addition to the FFGA funds, federal funds of \$70 million were provided to the Project through the American Rescue Plan Act approved by Congress in March 2021. In collaboration with the FTA and DTS, HART has filed the appropriate application and other documentation required for the release of these funds. HART anticipates the release of these funds in June 2022.

Table 3-2 is a summary of obligated and unobligated federal funding by fiscal year¹. The timing of the anticipated receipt of the remaining federal funds is based on our discussions with the FTA. HART understands these funds will be subject to the achievement of specified milestones.

¹ The current projected timing of remaining FTA funding of approximately \$744 million is shown in Table 3-2 and is also included in the financial plan shown in Table 6-2 (page 36). HART's analyses shows that accelerating these payments to three tranches of \$250 million in FY23, \$250 million in FY24, and \$244 million in FY25 would reduce estimated financing costs by approximately \$75 million from the current financial plan. Further, a lump sum receipt of \$744 million in FY23 would reduce financing costs by approximately \$130 million from the current financial plan.

Table 3-2: Obligated and Unobligated FTA Funding, by Year

Fiscal Year Allocations	Obligated Amounts	Unobligated Amounts	Total
2008-2011	\$119,990,000		\$119,990,000
2012	200,000,000		200,000,000
2013	236,277,358		236,277,358
2014	250,000,000		250,000,000
2022	70,000,000		70,000,000
2023		\$125,000,000	125,000,000
2024		125,000,000	125,000,000
2025		125,000,000	125,000,000
2026		250,000,000	250,000,000
2027		118,732,642	118,732,642
Total	\$876,267,358	\$743,732,642	\$1,620,000,000

Note: \$1.550 billion in funding is through the Full Funding Grant Agreement for FTA Section 5307 Capital Investment Grant funds. The FY 2021 funding of \$70 million is through the American Rescue Plan approved by Congress in March 2021.

3.3 State-Wide GET and TAT

In 2005, the Hawai'i State Legislature approved a dedicated 0.5 percent GET surcharge to be provided to HART for the funding of the Project. This GET surcharge was initially effective through December 31, 2022. In June 2015, the State Legislature extended the GET surcharge through December 31, 2027. In September 2017, Senate Bill 4, which became Act 1, 2017 First Special Session (Act 1), was signed into law. Act 1 authorized an extension of the 0.5 percent GET surcharge for three additional years to December 31, 2030. Act 1 also increased the state-wide Transient Accommodation Tax (TAT) by 1.0 percent and dedicated the revenues from that increase to the capital costs of the Project beginning January 1, 2018, through December 31, 2030.

HART's financial plan includes actual GET and TAT funding received through April 2022, and projected funding from collections that will be made through December 31, 2030. Due to the timing of the collections by the State and the subsequent payments made to HART, some of the 2030 collections will be received by HART in 2031. The projections are based on historical growth rates as recommended by the Tax Research and Planning Office of the State of Hawai'i Department of Taxation, as further described below.

In the 2018 Recovery Plan, projections for GET and TAT were based on forecast growth rates published by the State's Council on Revenues (COR), an economic forecasting body appointed by the Governor and State Legislature. COR's State revenue estimates are used to prepare the State's biennial budgets and appropriations. Although the COR projections are primarily used for the State's next two budget cycles, COR typically publishes a 6-year forecast. In 2018, before using COR's projected rates of growth for GET and TAT, those growth rates were compared to historical growth rates and found to be reasonable. Such is not the case in 2022.

During the past two years, as the State's economy was significantly impacted by the pandemic, collections of both GET and TAT fluctuated significantly and became less predictable. Similarly, during

that time, COR's projections of GET and TAT frequently changed. Because COR is closely aligned and supported by the State Department of Taxation (DoTax), in February 2022, HART requested a meeting with the leadership of DoTax to discuss the appropriateness of the COR projections for HART's purpose of forecasting GET and TAT collections.

DoTax advised that the COR projections are not intended or appropriate for the long-term forecasting of individual revenue categories, such as GET or TAT. For that reason, and because of the recent fluctuations of GET and TAT collections, DoTax recommended that historical growth rates would be a more appropriate basis for forecasting GET and TAT collections. Given that (1) Hawai'i is emerging from the negative economic impact of the pandemic, (2) the remaining construction period for the Project is less than 10 years, and (3) the State GET and TAT funding will end on December 31, 2030, DoTax recommended that the historical growth rates over the 10 years leading up to COVID-19 (2010 through 2019) be used to forecast GET and TAT collections for the HART financial plan.

Tables 3-3 and 3-4 below summarize the historical collections and annual rates of change from FY 2010 through 2019 for GET and TAT. The GET information in Table 3-3 is based on actual collections received by HART. As HART only began receiving TAT in 2018, the information in Table 3-4 is based on the state-wide TAT collection data provided by DoTax. As shown in the tables, GET and TAT experienced compound annual growth rates of 5.83 percent and 9.1 percent, respectively, in the 10 years preceding the COVID-19 pandemic. These growth rates are being used to forecast HART's future GET and TAT funding.

Table 3-3: Collections by HART from General Excise Taxes, FY 2010 - FY 2019

General Excise Tax Collections		
Fiscal Year	Collections (\$)	Annual Change
2010	162,048,559	-1.0%
2011	228,516,861	41.0%
2012	143,676,207	-37.1%
2013	170,455,106	18.6%
2014	219,289,704	28.7%
2015	220,793,293	0.7%
2016	229,344,241	3.9%
2017	226,179,113	-1.4%
2018	260,802,235	15.31%
2019	269,957,975	3.5%
Compound Annual Growth Rate FY 2010 - 2019		5.83%

Source: City and County of Honolulu, February 2022

Table 3-4: Transient Accommodation Tax Gross Receipts, FY 2010 - FY 2019

Transient Accommodation Taxes Gross Receipts		
Fiscal Year	Gross Receipts (\$)	Annual Change
2010	2,692,891,899	-1.7%
2011	3,164,773,319	17.5%
2012	3,549,775,789	12.2%
2013	4,012,771,941	13.0%
2014	4,271,485,883	6.4%
2015	4,486,974,246	5.0%
2016	4,707,940,417	4.9%
2017	5,125,513,810	8.9%
2018	5,454,343,785	6.4%
2019	5,911,970,043	8.4%
Compound Annual Growth Rate FY 2010 – 2019		9.13%

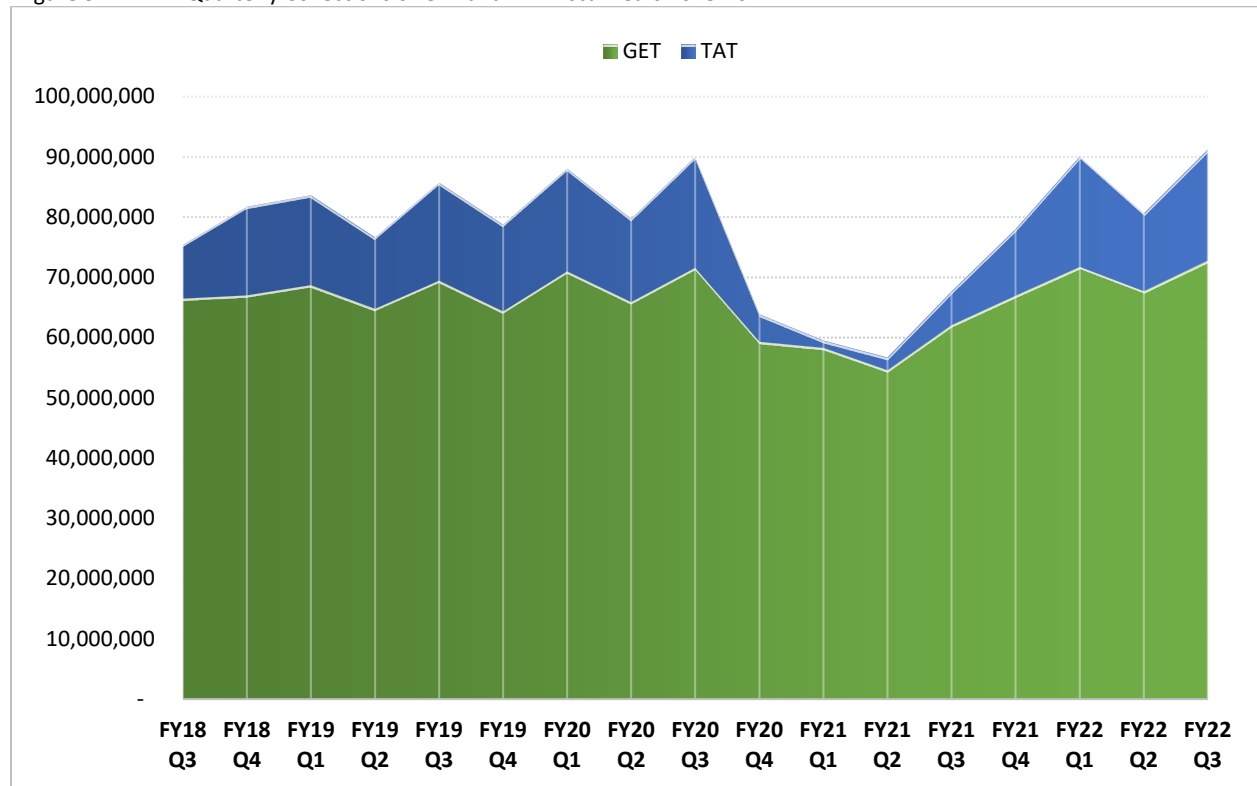
Source: State of Hawai'i Department of Taxation, February 2022

Hawai'i's economy was significantly impacted by COVID-19. The visitor industry, which impacts many aspects of the local economy, came to a standstill. Understandably, both GET and TAT were also adversely impacted. TAT, which is essentially a tax on visitor accommodations, was extremely low for most of the calendar year 2020. Beginning in the first calendar quarter of 2021, GET and TAT began to recover. In the third calendar quarter of 2021, HART's collection of GET and TAT rebounded to a historical high as the reopening of the visitor industry fueled Hawai'i's economy to show strong signs of recovery.

While the global impact of the COVID-19 pandemic illustrates the vulnerability of these funding sources, it also demonstrates that the economy of the State and the City are fundamentally resilient as employment rates, construction, and tax collections remained stronger than expected throughout this significant economic event. A key factor in the strength of the GET is that the State's GET is broader than most states' sales taxes, which are typically limited to retail transactions. Instead, Hawai'i's GET applies more broadly to business transactions such as wholesaling and real estate rentals and includes both goods and services. Since the GET is broad-based, capturing income from the sale of services as well as goods, it has proved resilient in the subsequent economic rebound.

Figure 3-2 illustrates the levels of quarterly collections of GET and TAT beginning in 2018 after the passage of Act 1 through the most recent 2022 quarter. This figure illustrates the negative impact of COVID-19 by the decline in GET and TAT in late 2020, continuing through the first half of 2021, as well as the subsequent recovery beginning in the third quarter of 2021.

Figure 3-2: HART Quarterly Collections of GET and TAT Fiscal Years 2018-2022



3.4 City TAT

Beginning in 2022, a new funding source will be made available to HART. In July 2021, a law was enacted that allows each county to levy its own 3 percent TAT. This new tax is in addition to the State's 10.25 percent TAT already in place.

In the fourth quarter of 2021, the Honolulu City Council proposed and passed an ordinance establishing the 3 percent TAT on O'ahu (the City TAT). The City Council also approved an allocation of a portion of the new City TAT to the rail project. For the first two years of the City TAT, 33.33 percent of the TAT collected by the City, and thereafter, 50 percent of the City TAT, will be dedicated to the rail project. The ordinance was signed into law by Mayor Blangiardi on December 14, 2021.

HART estimates that the new City TAT will generate approximately \$75 million in its first year, with HART receiving 33.33 percent of that amount, or approximately \$25 million. In its revenue forecast, HART has applied the same TAT growth rate to the City TAT as it has to the State TAT funding source, as previously described.

The ordinance for the City TAT does not sunset, meaning that the funding goes to the transit fund in perpetuity. HART's current financial plan only includes these funds through December 31, 2030, consistent with the State TAT funds received under Act 1. However, the perpetual nature of these funds means that they could potentially provide additional, future funding to the Project beyond what is included in the current financial plan. Further, they could potentially allow for the issuance of general obligation bonds or loans from the Transportation Infrastructure Finance and Innovation Act (TIFIA) program. These potential future funds could be used to support future cash flow needs as contingency

funds to complete the truncated FFGA scope and/or to further the completion of the Project to Ala Moana Transit Center. In addition, following the completion of construction, these funds could support additional capital costs and/or system operations and maintenance costs.

3.5 City Subsidy

The City has committed to providing funding of \$214 million to HART, as first described in the 2018 Recovery Plan. This is in addition to the City being responsible for all future operations and maintenance costs of the rail system.

Of this amount, \$116 million has been funded through FY 2022. The remaining payments are expected to be received from the City on a pre-determined schedule through 2031, as follows:

Table 3-5: City Subsidy, by Year

Fiscal Year	Funding (millions)
Funded through FY 2022	\$116
FY 2023	17
FY 2024	12
FY 2025	10
FY 2026	10
FY 2027	10
FY 2028	10
FY 2029	10
FY 2030	10
FY 2031	9
TOTAL	\$214

3.6 Risks to Funding

The local funding committed to the Project, consisting primarily of GET and TAT collections, is subject to economic risks. Circumstances may exist or events may take place that impact Hawai'i's economy, including tourism, which could, in turn, impact the collections of GET and TAT. However, while the TAT collections are more volatile, GET collections have proven to be much more resilient and are by far the greater of the revenue sources for the project.

The COVID-19 pandemic is an example of such an event. Across the State, businesses closed, some permanently, and visitor arrivals severely declined. However, as discussed above and illustrated in Figure 3-2, the Hawai'i economy proved to be resilient and has shown strong signs of recovery.

4 Estimated Cost to Complete

The most current EAC for the full scope of the Project, including the 20-mile guideway, 21 stations, and the Pearl Highlands Parking Garage, is \$10.459 billion. Estimated financing costs of \$850 million would result in a total estimated cost of approximately \$11.3 billion for the full Project.

The EAC for constructing the Project with a truncated FFGA scope, as described in Section 2 of this document, is \$9.148 billion, plus estimated financing costs of \$785 million, resulting in a total estimated cost of \$9.93 billion.

4.1 Estimate at Completion

In March 2021, HART released a conservative revised EAC of \$11.37 billion, fulfilling a long-standing PMOC action item from 2019 to provide a realistic forecast at completion. This was a significant increase from the October 2020 EAC of \$9.131 billion. The primary drivers of the increase in the EAC were:

- A revised Project schedule, which better reflected achievable critical path activities of utility relocation, and guideway and stations design and construction;
- Increased costs of construction in the Honolulu market due to the impact of the COVID-19 pandemic on escalating material and labor costs;
- Industry pricing data from the higher-than-expected bid prices from the canceled P3 transaction; and
- Incorporation of appropriate and probable Project risks from the Risk Register, as described below in Section 4-7.

After the quantification of the drivers above and the projection of their impact on the revised EAC amount, HART immediately began exploring opportunities to reduce costs and mitigate Project risks. Staffing costs were reduced significantly as redundancies and inefficiencies were addressed to rightsize the organization. The Mauka Shift, as described in Section 1.2.3, was evaluated, and implemented to reduce both costs and schedule. Risk mitigations, such as the requirement for 100 percent design approvals for utility relocations, were incorporated into the Project plan.

4.2 Independent Cost and Schedule Assessment

In October 2021, HART retained an independent consultant, Triunity, to perform an Independent Cost Estimate & Schedule Assessment, with a focus on review of estimated costs to complete the Project and the corresponding Project schedule.

Triunity performed a top-down assessment of the individual project estimates and schedules that make up the remaining scope for the full-scope Project. The assessment was conducted utilizing Triunity's Subject Matter Experts (SMEs) and organized according to the current reporting structure utilized by the

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HART Project Team. The goal of the assessment was to provide an independent evaluation of HART's most recent cost estimates and schedules. Since portions of the Project are at different stages of delivery, the assessment was broken into respective sections to capture the program in totality.

Triunity found HART's EAC to be complete, well managed, and conservative, as intended. They also identified cost reductions totaling \$749.0 million, excluding the impact of the Mauka Shift, as summarized in the following table:

Table 4-1: Triunity Assessment/Recommendation Without Modification (dollars in millions)

Group	HART's Current EAC			Assessment Team's Recommendation			Delta
	Base	Contingency	Total	Base	Contingency	Total	
Guideway, Stations, Support Facilities, Systems and Vehicles	\$6,677	\$1,062	\$7,740	\$6,507	\$836.7	\$7,343	\$396.3
Real Estate and Art Elements	646.1	146.6	792.7	646.1	146.6	792.7	-
Professional Services and City and County Participating Departments	2,415	201.5	2,617	2,169	95.5	2,264	352.7
Unallocated Contingency	-	221.7	221.7	-	221.7	221.7	-
Total	\$9,738	\$1,632	\$11,371	\$9,321	\$1,301	\$10,622	\$749.0

Source: HART Program Cost Estimate & Schedule Assessment, December 2021, prepared by Triunity, Inc. (Part One, page 3)

Separately, Triunity performed a high-level assessment of the Mauka Shift initiative. Moving the guideway along a portion of Dillingham Boulevard to the mauka side of the roadway will allow the Project to avoid the relocation of significant utilities. The cost assessment for the Mauka Shift focused on three components: (1) utility relocations, (2) guideway savings, and (3) Professional Services (soft costs). Triunity identified additional cost savings of \$165.9 million related to the Mauka Shift. Most of these savings are attributable to the elimination of work, more efficient construction methods, a reduction of the overall project schedule, and a reduction in allocated contingency.

Including both the cost savings identified in the Triunity Cost Estimate Assessment report and the cost savings attributable to the Mauka Shift, the total cost savings is \$914.9 million, thus reducing the EAC for the full Project to \$10.459 billion (excluding finance costs).

The full Triunity report can be found in Appendix C. The Triunity recommendations were reviewed by the HART team for appropriateness and ultimately accepted into the EAC.

4.3 Cost for the Truncated FFGA Scope

Based on the accepted results of the Triunity assessment, HART developed separate cost estimates of various construction options to identify a fully functional system that could be delivered within the

forecast of available funding. The scenario most closely aligned with this objective is the proposed truncated FFGA scope, with an interim terminus at the Civic Center Station and the deferral of the Pearl Highlands Parking Garage. Using information from the updated EAC, the base cost for the truncated FFGA scope is \$9.148 billion (excluding financing costs).

The cost estimates for the truncated FFGA scope were developed with a consistent, conservative manner and based on parametric estimating principles, with the Triunity validated numbers as the basis. The truncated FFGA scope includes approximately \$794 million of allocated contingency, which is a majority of the allocated contingency that is identified in Table 4-1 above for the full-scope Project. The same methodology was used for unallocated contingency by including the majority of the \$221 million from the 2018 Recovery Plan for extra Owner's Reserve. Both of the above contingency assignments recognize that the most difficult portion of the project, Dillingham Boulevard through downtown Honolulu, is included in the truncated FFGA scope.

HART believes the amount of contingency is appropriate to ensure achievability of the revised plan. The contingency also accounts for top Project risks related to present day escalation projections, COVID-19 impacts and unknowns related to resource volatility and availability. With HART's total anticipated future construction projects totaling roughly \$2 billion in base costs, this contingency reserve is approximately 40 percent relative to the remaining construction work and 24 percent relative to overall remaining base costs.

HART also recognizes that Professional Services is a substantial Project cost and the higher level of contingencies discussed above are warranted to cover risks related to these associated soft costs. Recently, HART awarded two of the four major Professional Services contracts, establishing the staffing costs related to the General Engineering Consultants (GEC: Jacobs) and the Construction, Engineering and Inspection (CE&I: Stantec) services. Both contracts were awarded with a base period of performance of five years and an option to exercise five additional extension years based on Project needs. The base contract amounts are expected to fulfill the Project needs for all remaining construction projects, including separate Design-Bid-Build delivery teams for each CCUR contract and a Design-Build team to deliver City Center Guideway and Stations. The favorable contract procurement reflects the organization's rightsizing and highlights a more efficient organization with an expectation to manage these base staffing levels awarded in each contract to Project completion. The combined major contract awards have been incorporated into our base cost estimates for the truncated FFGA scope.

4.4 Value Engineering Workshop

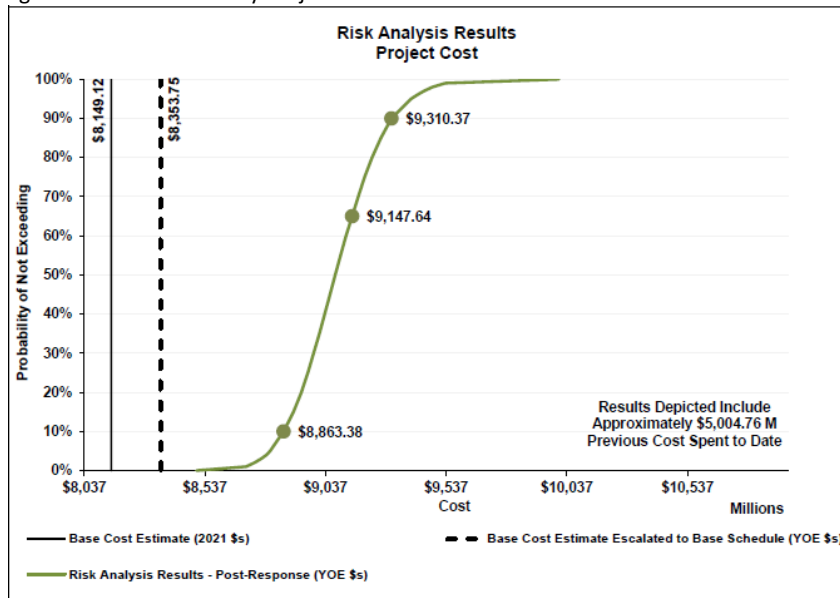
HART conducted a Value Engineering (VE) workshop in February and March 2022 to identify further opportunities to provide functions or services at a lower overall cost, consistent with requirements for performance, maintainability, safety, security, and aesthetics. The formal workshop was led by a Certified Value Specialist from our Project Management Support Consultant (PMSC) staff and attendees included the design and construction leads for each major element, DTS representatives and the PMOC. Over the two-week workshop duration, the VE team generated ideas for the Project that were compared against the baseline concept and the project performance criteria as defined by the Project team. The ideas that resulted with the best performance were further developed and brought forward for final recommendations.

The findings from this workshop were aggregated into three distinct categories:

- Recommendations that align with the truncated FFGA scope and Project requirements, that could be readily adopted, and do not require stakeholder or political approval. These findings provide near-term tangible cost reduction opportunities and were incorporated into the EAC.
- Ideas that were categorized as future potential cost savings or secondary cost mitigations because they require some form of stakeholder or political approval or could not be appropriately adopted at this time. These ideas require further analysis. This category of ideas has not been incorporated into the cost or schedule estimates.
- Ideas that will not be pursued as they do not align with the truncated FFGA scope or do not conform to the Purpose and Need of the Project or the Project requirements. These ideas are not included into the cost or schedule estimates.

HART included the near-term tangible cost, schedule, and risk reduction opportunities in an updated Monte Carlo Risk Model. Below in Figure 4-1 are the updated results for the P65 probability Project cost. These results were derived from the VE team of estimators, schedulers, and SMEs and were separate of the team and process that derived the truncated FFGA scope estimates discussed above. The results were two independent validations of scenario cost and schedule estimates.

Figure 4-1: P65 Probability Project Cost



Risk-Adjusted Cost Results (in Millions \$s)				
Category	Base Cost 2021 \$s	Base Cost YOE \$s	65 th Percentile 2021 \$s	65 th Percentile YOE \$s
Pre-Response Results Total Project	\$8,149.12	\$8,353.75	\$9,195.65	\$9,669.01
Post-Response Results Total Project			\$8,822.13	\$9,147.64

4.5 PMOC Risk Assessment

The PMOC conducted a Risk Assessment workshop in late March 2022, with attendees from the FTA, PMOC, and the Project team. Many risk topics were discussed during the workshop. Those topics were already accounted for in the independent cost assessment discussed in Section 4.2.

4.6 Adequacy of Contingency

Contingency is allocated at the individual project level to address any unforeseen costs or risks related to design development, construction, and other conditions specific to each project. Contingency values are established and managed based on inputs from HART's Project Management team and in accordance with FTA guidelines. A baseline contingency drawdown curve has been established and will be used as the metric to ensure appropriate levels of contingency are managed and reported throughout the lifecycle of the Project. The Project team has also developed a monitor and control process to ensure the proper tracking, management, and proactive reporting of contingency funds.

HART believes it is prudent to maintain the current level of allocated contingency. The current \$794 million of Allocated Contingency equates to approximately 24 percent of the estimated remaining cost and 40 percent of the remaining design and construction work to be performed. This is considered to be a conservative level of contingency, but is also deemed to be appropriate to increase the certainty

of fulfilling our commitment for the completion of a functional rail system for the City and County of Honolulu. It is anticipated that the contingency will provide HART with the capacity to withstand potential stress tests, such as delays in receipt of funding or increases in cost. The Project team will focus on managing, reducing, or mitigating the inherent risks that drive the need for this contingency as the Project progresses.

4.7 Project Schedule Assessment

In addition to assessing the EAC, Triunity assessed the Master Project Integrated Schedule (MPIS) for reasonableness and performed a top-down assessment of the individual project/contract schedules that make up the remaining scope of the Project. The assessment was conducted utilizing Triunity's SMEs. The goals of the assessment were to provide HART with an evaluation of the latest completion schedules and provide an opinion as to their level of appropriateness for the various projects. Since projects are currently at various stages of delivery, the assessment was divided into the three Operational Segments as previously identified.

Triunity briefly considered train procurement schedules with the understanding that trains have been procured through the CSC, and 18 of the 20 trains are already delivered to support testing and operations.

Triunity assessed the Right-of-Way schedules by validating that access agreements to parcels are tracking ahead of the needs for construction. The integrated schedule logic and sequencing was confirmed by review and meetings with the design, construction and Right-of-Way team. The inherent schedule impacts and forecast information was validated.

For the final step of the assessment, Triunity concurrently examined the remaining program schedule, claims log, and risk register to ensure the impacts were appropriately captured.

Reviews of the cost EAC (as it relates to the schedule), claims, and the risk register were performed at a high level, targeted to assist in the overall schedule assessment.

Triunity analyzed the actual schedule progress in the following areas:

- Against the original baseline "planned" schedule for the Airport Guideway and Stations (AGS) segment (Operating Segment 2).
- The latest forecast curves, that include the baseline projection metric versus as-built, quantity based forecast projections.
- The current Critical Path Method (CPM) schedules are used for forecasting the remaining contracts to complete.
- A robust list of evaluated risks (either mitigated or managed).

Triunity concluded that the lessons learned and actual production rates thus far, have been adequately modeled Project-wide, ensuring a greater probability of achievement for Trial Running to begin for

Segments 1, 2, and 3.

Triunity also reviewed the management of risks using the centralized Risk Register developed by HART, organized by FTA's 5 Risk Categories, and assigned to FTA's Level 2 Standard Cost Categories. Essentially all remaining risks in the Risk Register pertain mostly to Segment 3, as Segments 1 and 2 have completed sufficient construction towards mitigation of their specific risks. The most common high-risk areas identified were utility relocation, third-party approvals and Right-of-Way.

"Expected Values" of risks were modeled by applying probabilities and cost/schedule ranges of low, most likely, and high, then using Monte Carlo methods to run multiple simulations to arrive at a 65 percent likelihood (P65) outcome used in forecasting total Project EAC and Schedule Completion. The results for Segment 3 are summarized below:

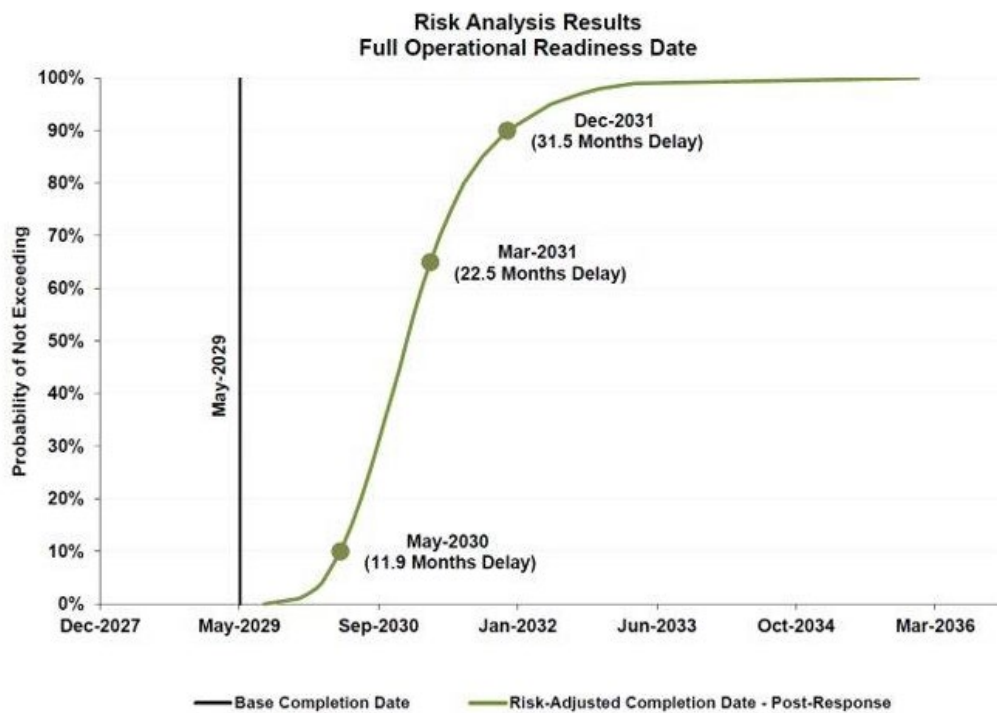
- Construction – 49 risks, 19 on the critical path, 27 months total cumulative expected impact based on concurrent and sequential logic ties.
- Design – 8 risks, 3 on the critical path, 6 months total cumulative expected impact.
- Management Capability and Capacity – 4 risks, 1 on critical path, 0 (zero) months total cumulative expected impact.
- Market Conditions – 2 risks, 0 (zero) on critical path, 0 (zero) months total cumulative expected impact.
- Requirements – 32 risks, 5 on the critical path, 20 months total cumulative expected impact.

The remaining schedules were considered to have adequate duration contingencies included to cover these high-risk areas, with continuous monitoring and management needed to assure on-time completion.

Recently, schedule estimates were developed for the truncated FFGA scope, recognizing that the longest path to Project completion remains to be Dillingham Boulevard through downtown Honolulu, the most difficult portion of the Project. A major focus of the VE workshop was schedule efficiency, schedule risk reduction and management of the critical Project interfaces. The VE team focused on enabling early guideway and station construction, schedule incentives, and managing access between utility relocations, and the subsequent drilled shaft work.

Overall schedule contingency is based on the Monte Carlo risk analysis using the no-float base schedule of May 2029 for Project completion. Figure 4-2 is the most recent analysis and basis for HART's Operational Readiness date of March 2031, which was deemed appropriate by the Triunity evaluation.

Figure 4-2: P65 Project Schedule



5 Financing

A financing plan was developed to (1) provide for efficient cash flow needs of the Project, (2) preserve the City's financial condition, (3) minimize finance charges, and (4) fund debt service solely from revenues commensurate with the expiration of the GET and TAT funding.

It is common in large-scale construction projects for there to be periods when capital expenditures are greater than the funding that is available at the time of the expenditure. At such times, borrowing funds to cover cash flows is necessary. HART utilizes a combination of General Obligation (GO) bonds and short-term borrowing in the form of Tax-Exempt Commercial Paper (TECP) (up to a 270-day revolving basis) through the City. All such borrowing by HART will be repaid by forecast Project funding.

HART and the City entered into a Memorandum of Understanding (MOU) on May 7, 2015, which was amended and restated on July 26, 2017. The MOU provides, among other things, that HART is required to deposit into the City's general fund a debt reserve equal to the lesser of 10 percent of the par value of the outstanding bond amount or 50 percent of the maximum annual debt service on all outstanding bonds. This financial plan anticipates the release of the debt reserve for debt service requirements in fiscal years 2030 and 2031.

The financial plan assumes an interest rate of 4.5 percent for fixed-rate GO bonds issued after July 2022, upon advice of investment bankers. The rate used is based on the City's current AA+/AA1 bond ratings. The interest rate used for TECP is 3.0 percent. Issuance costs of debt are estimated at 0.4 percent of gross GO bond proceeds and the TECP line of credit.

A summary of current and forecast bond activity is presented in Table 5-1. As of April 2022, the current principal amount of GO Bonds outstanding is \$988.7 million, and there is no outstanding TECP. In the financial plan, through the completion of the Project to the interim Civic Center Station terminus, total GO bond proceeds are expected to be \$2,988.7 million². TECP is a revolving borrowing arrangement with a maximum \$350 million outstanding limit. All debt, including GO bonds and TECP, included in the financial plan will be repaid from Project funding before the end of FY 2031.

² Note that the financial plan, included as Table 6-2 (page 36), assumes only GO bond financing in the future. However, HART is evaluating, and will likely utilize, TECP as a more efficient financing tool for a portion of future cash flow needs. Utilizing TECP as part of the financial plan is expected to reduce financing costs considerably.

The current interest rate for TECP (as of May 2022) is 1.95%, compared to the interest rate used in this plan for future GO bonds of 4.5%.

Additionally, in the current financial plan, an assumption was made that there will be no bond premiums on future GO bond issuances, however, such premiums have been received in the past. It is difficult to estimate potential future premiums.

Table 5-1: Summary of GO Bond Activity (dollars in millions)

Fiscal Year(s)	Actual GO Bond Issuances To Date	Forecast GO Bond Issuances	Subtotal of GO Bond Issuances (Principal)	Repayment of GO Bond Principal	Net End-of-Year Outstanding Principal
FY 2007 - 2021	\$1,009.0		\$1,009.0	\$350.0	\$659.0
FY 2022	329.7		329.7		988.7
FY 2023				36.5	952.2
FY 2024				56.0	896.2
FY 2025		650.0	650.0	96.2	1,450.0
FY 2026		550.0	550.0	132.3	1,867.7
FY 2027		450.0	450.0	137.9	2,179.8
FY 2028				212.8	1,967.0
FY 2029				449.8	1,517.2
FY 2030				799.0	718.2
FY 2031				718.2	0
TOTAL	\$1,338.7	\$1,650.0	\$2,988.7	\$2,988.7	\$0

6 Financial Plan for Capital

This section includes HART's financial plan for the Project's truncated FFGA scope.

The components of the financial plan have been discussed in more detail in previous sections, specifically: Project funding (discussed in Section 3); EAC (discussed in Section 4); and Capital Financing (discussed in Section 5).

The total sources and uses of funds that comprise the financial plan for the truncated FFGA scope are summarized in Table 6-1.

Table 6-1: Financial Plan Summary for the Truncated FFGA Scope (dollars in millions)

Sources and Uses of Funds	
Project Funding (detailed in Table 3-1)	\$9,812.8
GO Bond Proceeds	2,988.7
TECP Proceeds	575.0
Bond Premiums received at issuance (actual to date)	239.5
Bond Reserves Releases from Budget and Fiscal Services (BFS)	254.3
Total Sources of Funds	\$13,870.3
Uses of funds	
Project Costs Estimate at Completion (EAC)	\$9,148.0
GO Bond Repayment	2,988.7
TECP Repayment	575.0
Financing Costs (Interest and Fees on GO Bonds and TECP)	784.6
Bond Reserve Deposits Placed with BFS	254.3
Total Uses of Funds	\$13,750.6
SURPLUS OF SOURCES OVER USES	\$119.7

Any surplus of sources over uses of funds will be used for costs related to the subsequent phase of the Project, from the Civic Center Station to the Ala Moana Transit Center.

The detailed financial plan for the truncated FFGA Scope is presented in Table 6-2. The financial plan includes, on an annual basis, the actual funding received, and expenditures incurred for FY 2007 through FY 2021. Project funding and expenditures for fiscal years 2022 through 2031 (the final year in which the actual GET and TAT collections will be received by HART) are based on projections, as discussed in the previous sections of this report. Long and short-term capital financing, in the form of GO bonds and TECP, are used as necessary to balance the funding and the expenditures, with full repayment of the financing before the end of FY 2031.

2022 Recovery Plan – June 30, 2022

Table 6-2: Financial Plan for the Truncated FFGA Scope (FY 2007 - FY 2031)

Annual Cashflows (Dollars in Millions)	FY07-21	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031
Sources											
GET Collections	\$ 6,390.1	\$ 2,835.3	\$ 280.1	\$ 292.1	\$ 311.2	\$ 329.4	\$ 348.6	\$ 368.9	\$ 413.2	\$ 437.3	\$ 383.6
TAT Collections (Act 1)	1,100.9	154.8	61.1	72.0	75.6	82.5	90.1	98.3	117.1	127.8	114.3
FFGA (5309) Grant	1,550.0	806.0	-	125.0	125.0	125.0	250.0	119.0	-	-	-
Covid Relief Federal Funds	70.0	-	70.0	-	-	-	-	-	-	-	-
City Subsidy	214.0	95.0	21.0	17.0	12.0	10.0	10.0	10.0	10.0	10.0	9.0
City TAT Funds	487.8	-	-	27.0	29.5	48.2	52.6	57.4	68.3	74.5	67.7
Tax Based Sources	9,812.8	4,322.2	533.1	553.3	595.1	751.3	653.6	570.3	608.6	649.6	574.6
Bond Premiums Received	239.5	143.5	96.0	-	-	-	-	-	-	-	-
Bond Reserve Releases from BFS	254.3	-	-	-	-	-	-	-	-	24.3	230.0
TECP Proceeds	575.0	575.0	-	-	-	-	-	-	-	-	-
G.O. Bond Proceeds	2,988.7	1,009.0	329.7	-	650.0	550.0	450.0	-	-	-	-
Total Sources	13,870.3	5,618.6	857.9	533.1	1,245.1	1,301.3	1,103.6	570.3	608.6	673.9	804.6
Uses											
Cost Estimate at Completion (EAC)	9,148.0	4,747.3	361.3	402.6	514.5	873.3	988.3	717.4	129.2	72.8	19.1
G.O. Bond Interest	781.9	74.3	47.9	49.4	47.6	71.6	91.9	105.9	90.4	69.5	32.7
TECP Interest	2.7	1.9	0.8	-	-	-	-	-	-	-	-
TECP Repayment	575.0	300.0	275.0	-	-	-	-	-	-	-	-
G.O. Bond Principal Repayment	2,988.7	350.0	-	36.5	56.0	96.2	132.3	137.9	449.8	799.0	718.2
Bond Reserve Deposits Placed with BFS	254.3	56.8	32.5	-	-	65.0	55.0	45.0	-	-	-
Total Uses	13,750.6	5,530.3	717.5	488.5	618.1	1,106.1	1,267.5	1,006.2	669.4	941.3	770.0
Net Sources (Uses)	119.7	88.3	140.4	44.6	(64.8)	139.0	33.8	97.4	(60.8)	(267.4)	34.7
Beginning Cash Balance	-	-	88.2	228.6	273.2	208.4	347.4	381.2	413.2	352.4	85.0
Ending Cash Balance	\$ 119.7	\$ 88.2	\$ 228.6	\$ 273.2	\$ 208.4	\$ 347.4	\$ 381.2	\$ 478.6	\$ 413.2	\$ 352.4	\$ 85.0

7 Bus-Rail Integration and Ridership

Bus services and rail ridership are highly intertwined. This section will discuss (1) changes that will be implemented to the bus network as a result of the truncated FFGA scope, and (2) the impact of the truncated FFGA scope on rail ridership and total transit ridership.

To support the truncated FFGA scope, which includes the deferral of the last two stations and the Pearl Highlands Parking Garage, DTS developed an enhanced interim bus-rail integration plan that will be in place until the full buildout of the rail system occurs.

In the truncated FFGA scope scenario and with this enhanced interim bus-rail integration plan in place, ridership on the rail system is forecast to be approximately 84,000 daily passengers in the first year of full service. Consistent with national transit ridership reduction trends, due in part to on-demand ride hailing services, this ridership estimate is a decline of 16.5 percent from the approximately 100,600 daily rail passengers expected under the original FFGA scope.

Another important measure is the impact on overall transit ridership, referred to as “linked trips”, which describe a complete journey from origin to destination, including all enroute bus-rail connections. Under the truncated FFGA scope with the interim enhanced bus service, there are estimated to be 262,700 total daily linked trips. This is about 10,100 fewer trips than under the original FFGA scope, or a decrease of about 3.7 percent. This indicates that the bus-rail system under the truncated FFGA scope still serves about 96 percent of the total transit demand as under the original FFGA scope³.

Impacts of the truncated FFGA scope are anticipated to be temporary, as HART still plans to complete the Project to the Ala Moana Transit Center in a subsequent phase. Changes will be implemented to the bus network based on future extensions of the rail system as appropriate.

7.1 Enhanced Interim Bus-Rail Integration

DTS has prepared integrated multimodal transportation plans in preparation for passenger service on the rail system. The DTS Bus-Rail integration planning process continues to refine the future bus network described in the FEIS based on development patterns, employment, population, and travel characteristics, among other travel indications. In connection with the rail project, DTS has always contemplated a comprehensive, long-term restructuring of the bus network that will include, among other changes, the addition of new high-frequency community circulators, truncation of regional and peak-period express routes, and a modest expansion in the bus fleet.

³ Note that these ridership forecasts have been revised to reflect the recent declines in transit ridership that have occurred in Honolulu and other cities throughout the United States. According to the American Public Transit Association, these declines are attributable to a number of factors such as the rise of ride-sharing services, declines in gas prices, and increased traffic congestion (which increase bus transit travel times and makes it less competitive to the automobile).

7.1.1 Civic Center and Downtown Stations

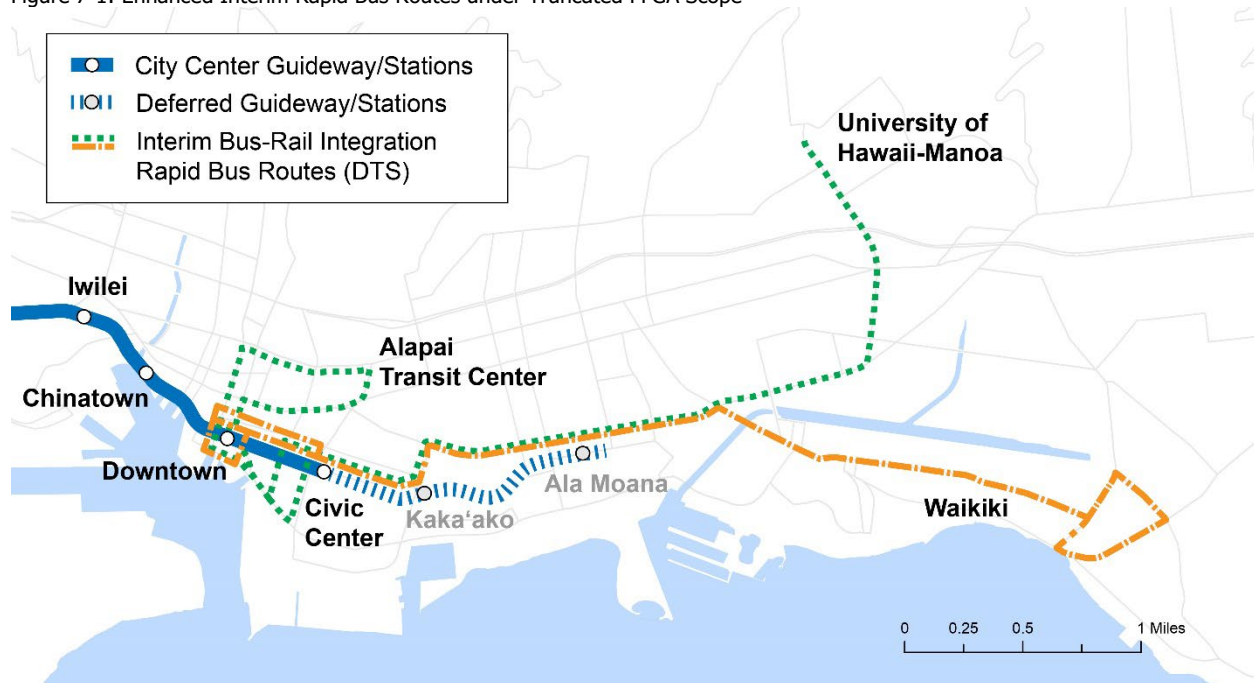
The enhanced interim bus-rail integration plan includes two new express, rapid bus routes that would connect the Civic Center Station and the Downtown Station to the Ala Moana Transit Center, UH-Mānoa, and Waikīkī. These new routes would match the peak and mid-day frequencies of the rail system with a 6-minute peak period and 10-minute mid-day service. These routes will also overlap and operate along the same route between downtown Honolulu and the Ala Moana Transit Center. Bus schedules will likely be staggered along this section of the route so that the combined headways result in frequent service every 2 to 3 minutes between Downtown Honolulu and the Ala Moana Transit Center.

The two new rapid bus routes would originate at the Downtown Station to better accommodate bus staging and to provide an additional transfer point. Serving the Downtown Station also provides additional mitigation for the deferral of the last two rail stations, since much of the projected rail ridership between downtown Honolulu and the Ala Moana Transit Center was anticipated to serve journeys to UH Mānoa and Waikīkī, which is still accomplished through this enhanced bus service.

Additionally, new community-circulator bus services connecting the Civic Center Station to nearby neighborhoods of Pacific Heights, Pauoa, Papakōlea, and Makiki will be implemented.

Figure 7-1 illustrates the two new rapid bus routes that will connect the Downtown and Civic Center Stations with the Ala Moana Transit Center, UH-Mānoa, and Waikīkī. In addition, the nearby Alapai Transit Center is also illustrated which will serve as a bus staging and electric bus re-charging location.

Figure 7-1: Enhanced Interim Rapid Bus Routes under Truncated FFGA Scope



7.1.2 Pearl Highlands Station

The proposed truncated FFGA scope includes the deferral of the 1,600-parking-space parking garage at the Pearl Highlands Station. However, a major bus transit center with a dedicated access ramp from the H-2 freeway will be constructed enabling faster, more direct bus routings to the Pearl Highlands Station from the Central O‘ahu and North Shore communities. To further shorten the overall travel times via transit, the regional bus routes serving Hale‘iwa, Wahiawā, and Mililani will be truncated and redirected to the station. During the peak period, buses will arrive more frequently – every 20 minutes instead of every 30 minutes. These additional frequencies will make it more convenient and faster for commuters to use transit. This will also enable drivers who would have otherwise parked in the Pearl Highlands Parking Garage to instead use the existing park-and-ride lots in Wahiawā and Mililani Mauka, or else eschew driving and take the bus directly to the Pearl Highlands Station. Additional details about the bus-rail integration plans are described in Appendix E.

7.2 Rail Ridership

An updated project travel demand forecasting model was used to identify impacts of the truncated FFGA scope on estimated ridership. The model also identified the impact on ridership of the enhanced bus services versus the baseline bus-rail integration plan. Previously, the model predicted 100,610 weekday rail boardings for the full alignment from East Kapolei to the Ala Moana Transit Center. Without any adjustments to the bus-rail integration plan, the model predicted that the rail system would have 71,065 weekday riders under the truncated FFGA scope, or a 29 percent decrease from the original FFGA scope. Taking into consideration the enhanced interim bus-rail integration plan, ridership on the rail system under the truncated FFGA scope is expected to be about 84,000 weekday riders. In other words, the enhanced interim bus routes added almost 13,000 daily riders to the rail system relative to the baseline bus network assumed in the Final EIS.

The net impact on ridership for the truncated FFGA scope with the enhanced interim bus services is estimated to have about 16,600, or 16.5 percent, fewer boardings than the original FFGA scope. As noted above, this impact is expected to be temporary as HART still plans to complete the Project to Ala Moana Transit Center as a subsequent phase.

The information described above is summarized in Table 7-1.

Table 7-1: Total Daily Rail Boardings

	Daily Rail Boardings	Change relative to the Original FFGA Scope	
		Difference	Percent
Original FFGA Scope	100,610	n/a	n/a
Truncated FFGA Scope	71,065	(29,545)	-29.4%
Truncated FFGA Scope with Enhanced Interim Bus	84,005	(16,605)	-16.5%

As shown in Table 7-2, over half of the eastbound linked trips made via transit along the Kapolei to Ala Moana corridor are heading to locations within the West Side, Kalihi, and downtown Honolulu – in other words, these riders would be departing the rail system before reaching the Civic Center Station. Another 38 percent of the eastbound trips are destined to UH-Mānoa, Waikīkī, or other destinations east of the originally planned FFGA terminus at the Ala Moana Transit Center, and would need to be completed by

bus under either the original or the truncated FFGA scope. Only about 9 percent of the eastbound trips are heading to Kakaʻako or Ala Moana Transit Center, the two rail stations that are deferred under the truncated FFGA scope. These are the trips that would have benefited from rail service under the original FFGA scope but will still be served by a bus-rail connection at the Civic Center Station. This underscores the importance of completing the Kakaʻako and Ala Moana stations, as planned in a later phase of the Project.

Table 7-2: Eastbound Corridor Trips via Transit, Truncated FFGA Scope

	West Side, Kalihi, and Downtown	Ala Moana and Kakaʻako	UH-Mānoa area	To Waikīkī	Total
Daily Linked Trips	58,518	9,268	23,458	17,780	109,024
Percentage	54%	9%	22%	16%	100%

Note: Kapolei to UH-Mānoa Corridor analysis zones only

7.2.1 Civic Center Station

Under the truncated FFGA scope, the Civic Center Station would become a major transfer hub for onward connections to the Ala Moana Transit Center, UH-Mānoa, Waikīkī, and other destinations. Boardings at the Civic Center Station would increase from about 3,250 daily boardings under the original FFGA scope to approximately 12,870 daily boardings under the truncated FFGA scope, as shown in Table 7.3.

During the morning peak period (6:00 a.m. to 9:00 a.m.), approximately 84 percent of the estimated 1,670 boardings and 80 percent of the 4,501 alightings at the Civic Center Station will be arriving or departing the station via bus, as shown in Table 7-4. This shows the importance of the connecting bus routes at this station. Table 7-4 also shows that there will be almost three times as many riders in the eastbound direction than in the westbound direction during the morning peak period. This also illustrates the importance of the rail system in bringing commuters into town from the west side of the island.

Table 7-3: Total Daily Boardings, Civic Center Station

	Total Daily Boardings at the Civic Center Station			
	Original FFGA Scope	Truncated FFGA Scope	Difference	Percentage Change
Civic Center Station	3,250	12,870	9,620	296%

Table 7-4: Total Boardings and Alightings during A.M. Peak Period, Civic Center Station

Means of Station Access/Egress	Boardings (Westbound)		Alightings (Eastbound)	
	Estimate	Percent	Total	Percent
Via Walking	260	16%	914	20%
Via Bus	1,410	84%	3,587	80%
Total	1,670	100%	4,501	100%

7.2.2 Pearl Highlands Station

The truncated FFGA scope also includes deferral of the Pearl Highlands Parking Garage. As shown in Table 7-5, the travel demand forecasting model estimates that this deferral would result in a reduction of overall system-wide ridership by about 1,500 daily boardings, or a 1.7 percent decrease.

Table 7-5: Ridership with and without Pearl Highlands Parking Garage

Scope	Rail Boardings		Difference	Percentage Change
	With Pearl Highlands Parking Garage	Without Pearl Highlands Parking Garage		
Truncated FFGA Alignment	85,481	84,005	-1,476	-1.7%

As discussed previously, without the parking garage at the Pearl Highlands Station, some of the parking demand can be accommodated at other nearby park-and-ride facilities. In addition, an analysis shows that 70 percent of the eastbound parking garage users originated in communities less than three miles from the Pearl Highlands Station and should reasonably be able to get to the station via other means, such as expanded bus routes, shared-ride services, or ride-hailing services like Uber and Lyft. About 30 percent of the parking garage users would originate three to five miles from the Pearl Highlands Station—Koa Ridge, Royal Kunia, Mililani Town, West Loch, or Ho’opili. These rail users could utilize other park-and-ride facilities, such as in Royal Kunia or Mililani Mauka. More analysis on park-and-ride users is provided in Appendix F.

7.3 Transportation Benefits

Overall, the truncated FFGA scope with the interim enhanced bus service is estimated to result in 262,732 daily linked bus-rail trips island-wide. As noted previously, linked trips describe a complete journey from origin to destination, including all enroute bus-rail connections. As shown in Table 7-6, the truncated FFGA scope with the interim enhanced bus service has about 10,100 fewer linked trips than in the original FFGA scope or a decrease of 3.7 percent. As shown in Table 7-7, the combination of bus and rail will increase transit ridership by almost 60 percent over 2019 levels. The truncated FFGA scope will still provide much of the same transportation benefits as the original FFGA scope, and the extension of the Project to the Ala Moana Transit Center is still planned as a subsequent phase of the Project.

Table 7-6: Total Daily Linked Trips, Original versus Truncated FFGA Scope

	Total Daily Linked Trips		Difference	Percentage Change
	Original FFGA Scope	Truncated FFGA Scope		
Rail and Bus Ridership Total	272,839	262,732	-10,107	-3.7%

Table 7-7: Total Daily Linked Trips, 2019 Baseline versus Truncated FFGA Scope

	Daily Linked Trips, 2019 Baseline	Daily Linked Trips, Truncated FFGA Scope	Difference	Percentage Change
Rail and Bus Ridership Total	165,391	262,732	97,341	58.9%

7.3.1 Improved Transit System Speed

The Project is intended to provide faster, more reliable public transportation to improve corridor mobility. One of the most significant needs, and a key performance indicator, is transit system speed. Although many bus-related operational improvements have been made in recent years, average transit vehicle speeds continue to degrade. The bus system's average speed in 2009 was 13.2 miles per hour (mph), but this had fallen to 12.7 mph by 2019. Without the rail system, the average bus speed is expected to be approximately 12.1 mph in 2030. With the opening of the rail system under the truncated FFGA scope, the trains are expected to average approximately 26 mph and the expected average speed of the total transit system (bus and rail combined) would increase to 14.8 mph. While the expected average speed of the total transit system is about 2 percent lower than the average speed under the original FFGA, it is still higher than 2019 levels and is consistent with the FEIS (Figure 3-6 of the FEIS).

7.3.2 Improved Travel Reliability

Another goal of the rail project is to "Improve corridor travel reliability," as measured by the "Percent of transit trips using fixed guideway" (FEIS Table 1-4). This is a critical measurement because it confirms that transit riders are taking advantage of the benefits of rail operations. As shown in Table 7-8, about 32 percent of all transit trips will involve a section on the rail under the truncated FFGA scope project. This indicates that the rail system will be an integral component of the City's overall transit system.

Table 7-8: Percentage of Trips on Rail

	Original FFGA Scope	Truncated FFGA Scope with Enhanced Bus Service
Total Daily Linked Trips	272,839	262,732
Total Daily Rail Boardings	100,610	84,005
% of Trips on Rail	36.9%	32.0%

Additional information on Bus-Rail Integration plans and Ridership are included in Appendices E and F respectively.

8 Management Capacity and Capability

The management, organization, and capability of HART to plan, construct, and deliver the Project to the City are of paramount importance. Additionally, the capability of DTS to commence revenue service and effectively and efficiently operate and maintain the rail system is critical to the long-term success of the Project. Ensuring the capacity and capability of management is an ongoing process to which HART and DTS are committed. As the Project advances, HART and DTS will assess changing needs and make ongoing adjustments, as necessary, to ensure appropriate staffing with the necessary competencies and skills.

8.1 HART Management Transition

In January 2021, Lori Kahikina was appointed to the position of HART Interim Executive Director and CEO. In January 2022, Ms. Kahikina was named to the permanent role of Executive Director and CEO. Ms. Kahikina joined HART with significant construction experience working for the City to deliver multi-billion-dollar, multi-year projects to completion on budget and on time. Ms. Kahikina has strong experience working with local contractors and City, State, and Federal agencies.

Also in January 2021, Ms. Kahikina appointed Rick Keene as Deputy Executive Director - Chief Operating Officer (DED-COO). Mr. Keene has over 30 years of executive and financial management experience. Mr. Keene most recently worked in City Administration serving largely as a liaison between the City and HART. Mr. Keene's career was primarily in financial leadership positions in the private sector, including the Chief Financial Officer positions at the State's largest healthcare system and the State's second largest financial institution.

In March 2021, Nate Meddings was promoted to Project Director. Previously Mr. Meddings held the position of HART's Director of Project Controls, giving him significant insight into the inner workings of the Project. Combined with his prior experience in complex and innovative construction management approaches, Mr. Meddings has been a significant addition to the HART executive team.

Professional biographies of the extended rail management teams of HART and DTS can be found in Appendix B.

8.2 Review and Reorganization

In early 2021, the newly formed executive team reviewed each position in the HART organization, including consultants and contractors to HART. They identified and eliminated duplication, redundancy, and excessive or unnecessary positions relative to the needs of the Project. As a result of this reorganization, HART's staff was reduced from 112 to 64 full-time equivalent positions. Similarly, the number of consultants who support the Project was reduced by approximately 30%. The timing of the staff reorganization coincided with a reduction in construction activity due largely to the substantial completion of Operating Segment 1 and the termination of the CCUR IDIQ contract. The staffing changes had an immediate and significant impact on the current and future costs of the Project. As construction of the City Center segment increases during the next few years, the expertise and levels of staffing will be closely managed and supplemented, as needed.

A significant organizational change implemented in 2021 was to align all Project development activities directly under the Project Director so that the Project Director can comprehensively oversee the Project from development, through execution, and to completion. This change also improved coordination, communication, and collaboration among the construction and development teams.

8.3 Organizational Culture and Communication

An element of the organizational changes was to streamline and flatten the Project team and to better connect the field staff with the management staff. This effort has resulted in significant improvements in the culture of the organization, the timeliness and effectiveness of decision-making, and the ability to act more quickly.

The management team has established a culture of being open, honest, and transparent about the Project. This stance has resulted in considerable improvement in HART's reputation and credibility with HART's key stakeholders, particularly with the City Administration, and State and City departments. Improved relationships with key stakeholders have been invaluable in planning, decision-making, approvals, and other Project needs.

The evolution of HART's culture has also had a very positive influence on HART's staff and consultants. As the HART atmosphere changed to one of transparency and open and honest communication, there has been a much greater sense of mutual respect, collaboration, and purpose. HART has recently begun using the phrase "One 'Ohana" to collectively refer to all HART staff, consultants, and contractors. In the Hawaiian language, 'ohana means family. Within HART, One 'Ohana reflects one family, one team, and all of us working together to accomplish the same goal: the completion of the Project in the most prudent and efficient way possible on behalf of the taxpayers.

To emphasize One 'Ohana, in early 2022, all design and construction staff were co-located from field offices to HART's main project office. In doing this, the staff is now easily accessible to each other to resolve issues, share ideas, and perform at the highest level possible.

8.4 HART Staffing Strategy

A discussion of HART's staffing strategy is included in the recently updated Project Management Plan. In summary, HART strives first and foremost to hire City employees to staff the Project. When positions are difficult to fill or when specific skills and expertise are needed, HART supplements its staffing through a contract with a designated Project Management Support Consultant (PMSO). This approach often provides quicker mobilization of experienced Project team members when needed, while HART continues to recruit City staff. From the beginning of 2021, the number of PMSO staff has been reduced from 20 to 6 as more staff have been hired or converted to City staff positions. The use of PMSO staff with specific expertise assists HART in meeting the Technical Capacity and Capability requirements set forth by the FTA.

HART has taken this strategic approach for staffing to ensure that appropriate expertise exists within the organization and that the level of staffing can be adjusted as the Project progresses. HART is confident that it can successfully deliver the Project with this staffing strategy and continued pursuit of excellence in its workforce.

8.5 PMOC Management Capacity and Capability (MCC) Review

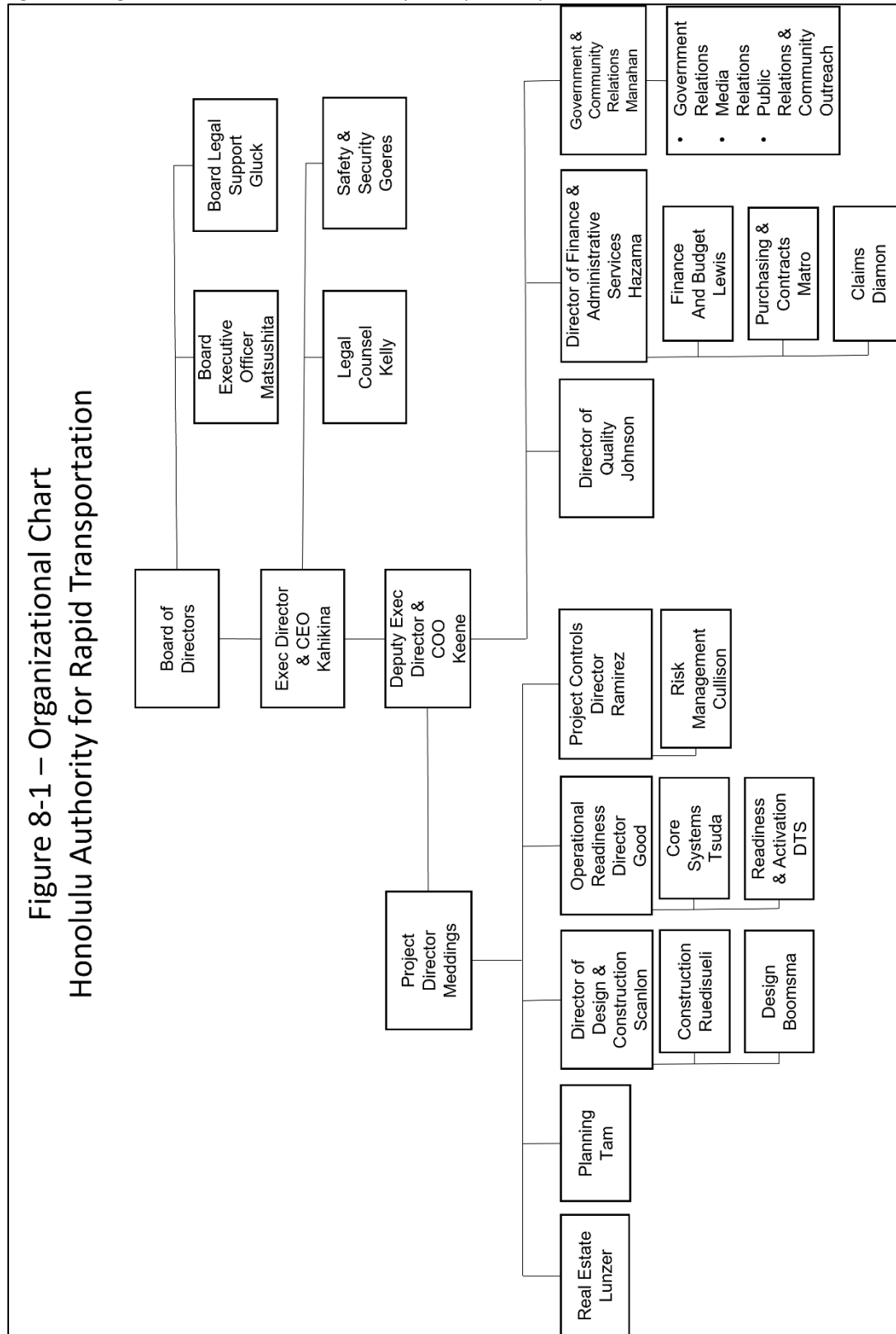
In November 2021, at the request of the FTA, the PMOC performed a MCC Review of the Project. HART regarded the overall results of the MCC Review to be positive and greatly appreciated the feedback and recommendations made by the PMOC. Some of the recommendations have already been achieved and the remainder are being implemented.

The report on the MCC Review was dated December 2, 2021, and can be found in Appendix D.

8.6 HART Organization

Figure 8-1, on the following page, is a summary of the HART Organizational Chart.

Figure 8-1: Organization Chart, Honolulu Authority for Rapid Transportation



9 Rail Operations and Maintenance Plan

As evidenced by the prior sections, the detailed planning for the integrated multimodal transportation system has been developed and will continue to be refined. Ultimately, any proposed changes to the existing bus service will involve the federally required public review process. That process is underway. The Rail Operations and Maintenance Plan is continuously updated to reflect refinements.

9.1 Core Systems Contract

DTS has a contract in place with HRHJV for the operations and maintenance of the rail system. The contract covers operation of the system and maintenance of the rail vehicles, track, stations, and train control and communications systems, among other things. The operations and maintenance term is for 10 years from the beginning of passenger service, with an option for a 39-month extension.

9.2 City Administration

The City, through DTS, is responsible for the operations and maintenance of the rail system. The DTS organizational structure consists of the Office of the Director, the Mobility Innovation Office, the Administrative Services Office, the Complete Streets Office, the Safety and Security Office, as well as the Transportation Engineering Division, Transportation Performance and Development Division, Transportation Mobility Division, Transportation Rail Division, and the Transportation Technology Division.

The Safety and Security Office is responsible for Safety Systems as well as Emergency and Security Systems. The Administrative Services Office is responsible for Contract Management and Electronic Revenue Systems.

The Transportation Rail Division is responsible for Rail Operations and Maintenance as well as Rail Facilities Management and Maintenance. The Director of Rapid Transit leads the division's daily business activities (finances, operations, and administrative activities) to ensure safe, dependable, and resilient transit service is delivered to the communities of O'ahu .

The Rail Operations and Maintenance Branch is responsible for the following areas: Rail Operations Center, Train Operations, Station Operations, Rolling Stock, Track and Structures, Traction Electrification, Train Control, and Telecommunications. The Rail Facilities Management and Maintenance Branch are responsible for the following areas: Stations, Elevators, Escalators, and Parking Facilities. Staff is co-located with the CSC to ensure collaboration, coordination, and teamwork.

9.3 Electronic Revenue Collection

The HOLO revenue system is the electronic system supporting fare payment on the public buses, paratransit services, and rail system. The revenue system includes Ticket Vending Machines (TVMs) located at rail station entrances, fare gates defining the boundary between paid and unpaid areas,

customer service terminals and retail sales devices, fare validation equipment, and central back-office equipment providing all core revenue collection functions.

TVMs and fare gates conform to all accessibility requirements including, but not limited to, languages available, audio volume, and visual display characteristics. The revenue system uses electronic fare media (smart cards) for seamless transfer between Honolulu's bus and rail systems. The HOLO revenue system is used to control access to the rail stations.

9.4 Track and Guideway

The CSC is responsible for track maintenance. The track network includes approximately 37.8 miles of mainline tracks, including cross-overs and tail track, and 5.4 miles of yard track. The mainline track structure employs both plinthless direct fixation track and direct fixation track on plinths in different segments. The track rails are supported by concrete crossties that are supported by ballast rock in the Rail Operations Center and at-grade track sections adjacent to the yard. The mainline is primarily double track throughout the System.

DTS is responsible for the guideway structures. A Lead Operations and Maintenance Contractor (LOMC) was selected to perform Station and Guideway Maintenance Services (LOMC-SGM), according to the scope and frequencies recommended by the designer. Guideway structure elements inspected and maintained include expansions joints, guideway surface, columns, girders, bearings, and critical connections.

The DTS Track Compliance Officer is responsible for overseeing relevant work by the CSC and managing the LOMC-SGM contract including all structural integrity, relevant plans, procedures, and work instructions.

9.5 Security

The rail system has security cameras, emergency and information call points, sophisticated security software, as well as security staffing. System security for the rail system is implemented through the System Security Plan (SSP). The SSP includes methods and strategies for detecting, deterring, and responding to security threats during operations and maintenance. The plan includes a three-level security approach, expressed as Level 1 Security, Level 2 Security, and Level 3 Security.

The CSC is responsible for providing Level 1 Security throughout the system. The responsibilities include activities such as the prevention of access to non-public areas, prevention of damage to security support systems (CCTV), customer assistance, and crowd control.

DTS is responsible for Level 2 Security. A Contractor was selected for Level 2 Security Services (LOMC-L2S). The LOMC-L2S staff is stationed in the Operations Control Center to coordinate with the CSC, other LOMC-L2S staff in the field, and emergency responders. The responsibilities include security monitoring via the security console at the Operations Control Center, roving patrols onboard trains, and security at fixed posts at select stations.

The Honolulu Police Department is responsible for Level 3 Security on an as-needed basis. The responsibilities include addressing suspected or actual criminal activity.

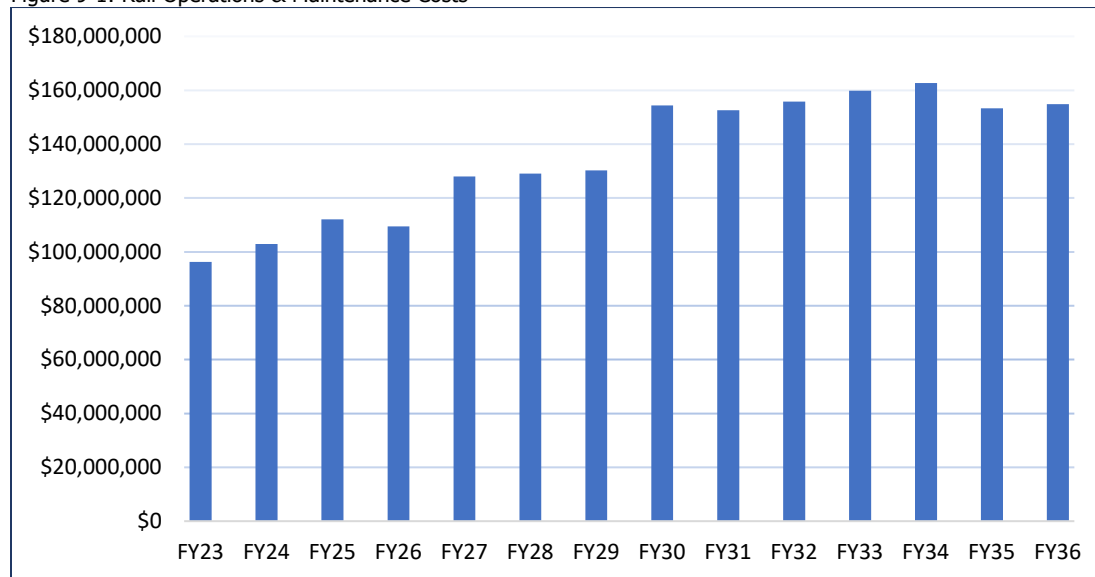
The DTS Manager of Emergency and Security Systems is responsible for overseeing the security responsibilities of the CSC and managing the LOMC-L2S contract including all relevant plans, procedures, and work instructions.

9.6 Rail Operations & Maintenance Costs

The rail system will be fully integrated with bus operations, which will be reconfigured to add a feeder bus service to provide increased frequency and more transfer opportunities between bus and rail. The rail and truncated bus service provide additional travel options, increased service frequencies, expanded hours of operation, minimized wait times, reduced total travel times, improved service reliability, and enhanced comfort and convenience for passengers.

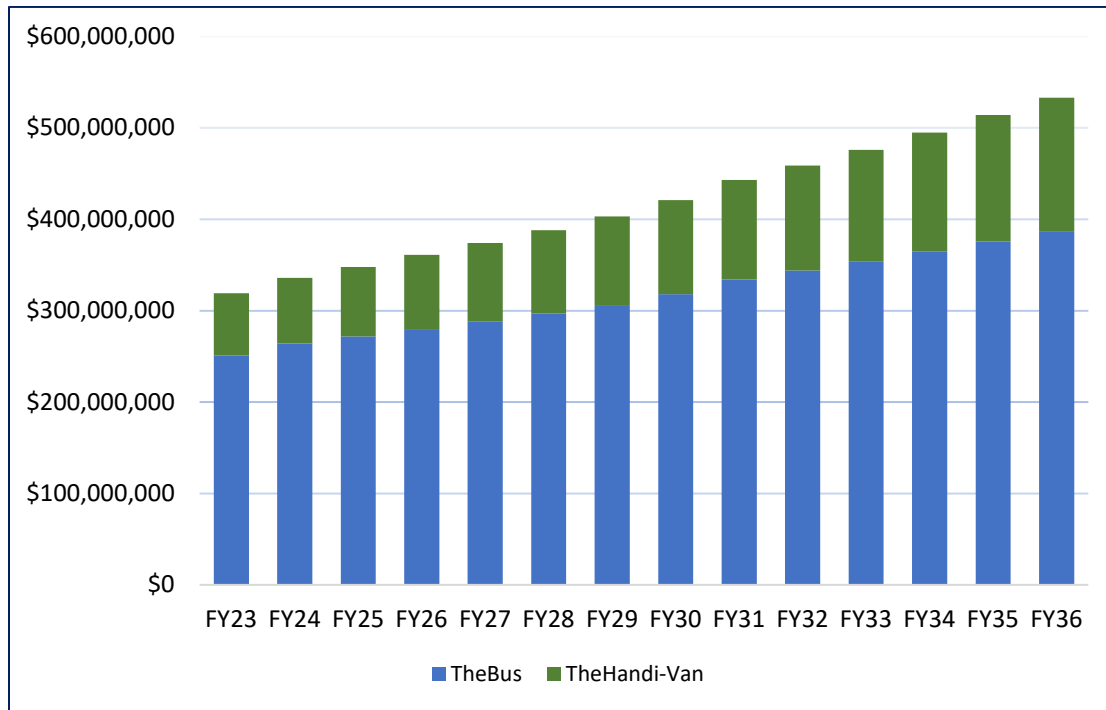
The rail operations and maintenance (O&M) costs have been forecast through the year 2036 and are shown in Figure 9-1. These costs include salary, current expenses, and equipment with projected economic price adjustments for inflation. The City, through its DTS, is responsible for rail O&M costs. These costs will be budgeted annually, as part of the City's normal budgeting process, along with the bus O&M costs discussed below.

Figure 9-1: Rail Operations & Maintenance Costs



TheBus and TheHandi-Van O&M costs were developed using existing bus operations as the baseline as well as anticipated service levels through FY2036 and are presented in Figure 9-2. Further detail on TheBus and TheHandi-Van O&M costs and revenues are discussed in Appendix G.

Figure 9-2: TheBus and TheHandi-Van Operations & Maintenance Costs



Appendices

Appendix A – List of Acronyms and Abbreviations

Appendix B – HART and DTS Staff Biographies

Appendix C – Triunity Report: HART Program Cost Estimate & Schedule Assessment

Appendix D – PMOC Management Capacity and Capability Review

Appendix E – Operating Plan Enhance Bus Service

Appendix F – Ridership Forecasts

Appendix G – Operating Plan Annual Costs

Appendix A

List of Acronyms and Abbreviations

Appendix A - List of Acronyms and Abbreviations

Acronym	Means
ADA	American Disabilities Act
AGS	Airport Guideway and Stations
BRIP	Bus-Rail Integration Plan
CARES	Coronavirus Aid, Relief, and Economic Security
CCGS	City Center Guideway Stations
CCTV	Closed-Circuit Television
CCUR	City Center Utility Relocation
CDT	Construction Document Technologist
CE&I	Construction, Engineering, and Inspection
CEO	Chief Executive Officer
COR	State of Hawai'i Council on Revenues
CP3P	Certified Public-Private Partnership Professional
CPM	Critical Path Method
CPP	Contract Packaging Plan
CPTED	Crime Prevention Through Environmental Design
CSC	Core Systems Contractor
CSSD	Certified Safety and Security Director
CSSTO	Chief Safety, Security and Technology Officer
DB	Design-Build
DBB	Design-Bid-Build
DBFOM	Design-Build-Finance-Operate-Maintenance
DED-COO	Deputy Executive Director - Chief Operating Officer
DoTax	State Department of Taxation
DTS	City and County of Honolulu, Department of Transportation Services
EAC	Estimate At Completion
ED-CEO	Executive Director - Chief Executive Officer
ES	Executive Summary
FEIS	Final Environmental Impact Statement
FFGA	Full Funding Grant Agreement
FFY	Federal Fiscal Year
FTA	Federal Transit Administration
FY	Fiscal Year
GEC	General Engineering Consultant
GET	General Excise Tax
GO	City and County of Honolulu General Obligation Bonds
HART	Honolulu Authority for Rapid Transportation
HOLO	Department of Transportation Services Fare Card
HRHJV	Hitachi Rail Honolulu Joint Venture

Acronym	Means
H RTP	Honolulu Rail Transit Project
HWEA	Hawai'i Water Environment Association
IDIQ	Indefinite Delivery Indefinite Quantity
LEED	Leadership in Energy and Environmental Design
LPA	Locally Preferred Alternative
MCC	Management Capacity and Capability
MOU	Memorandum Of Understanding
MPIS	Master Project Implementation Schedule
MSF	Maintenance and Storage Facility
O&M	Operations and Maintenance
OTS	O'ahu Transit Services
ORTP	O'ahu Regional Transportation Plan
P3	Public-Private Partnership
PMOC	Project Management Oversight Consultant
PMSC	Project Management Support Consultant
RAISE	Rebuilding American Infrastructure with Sustainability and Equity
RFB	Request for Bids
TPSCTP	Public Transportation Safety Certification Training Program
SME	Subject-Matter-Expert
SSP	Safety and Security Plan
TAT	Transient Accommodation Tax
TCCI	Transportation Technology Center Inc.
TDFM	Travel Demographics and Forecasting Model
TECP	Tax-Exempt Commercial Paper
TIFIA	Transportation Infrastructure Finance and Innovation Act
TSSP	Transit Safety & Security Program
TVMs	Ticket and Vending Machines
UH	University of Hawai'i
UHWO	University of Hawai'i West O'ahu
USDOT	United States Department of Transportation
VE	Value Engineering
WSSG	West Side Stations and Guideway

Appendix B

HART and DTS Staff Biographies

Appendix B – HART and DTS Staff Biographies

HART Executive Director and CEO – Lori Kahikina (HART)

Ms. Kahikina is the Executive Director and CEO of HART. Ms. Kahikina is a proud graduate of Kamehameha Schools and the University of Hawai'i. She holds a Bachelor of Science degree in Mechanical Engineering and has a license in Civil Engineering. Before joining HART, Ms. Kahikina was the Director of Environmental Services with the City and County of Honolulu where she was responsible for administering the design and construction of the City's wastewater and solid waste programs with approximately 1,100 personnel. As Director, Ms. Kahikina was responsible for the execution of a federally mandated consent decree wastewater program of over \$5 billion. While under her tenure, the various projects were completed on time and within the program budget. In addition, Ms. Kahikina was an active member of the Hawai'i Water Environment Association (HWEA) serving as their President, Vice President, Co-Chair, and other positions over the years.

Deputy Executive Director and Chief Operating Officer – Rick Keene (HART)

Mr. Keene has over 30 years of executive and financial leadership experience and currently serves as HART's DED-COO. Before joining HART, Mr. Keene spent three years in City Administration primarily serving as a liaison between the City and HART. Previously, Rick was the Chief Financial Officer and Treasurer of The Queen's Health Systems, with system-wide financial and information technology responsibility. Before joining Queen's, Rick was Vice Chairman and Chief Financial Officer of Bank of Hawai'i Corporation. Rick began his career with Ernst & Young and is a graduate of Virginia Tech. He currently serves on the Board of Directors of Navian Hawai'i (formerly Hospice Hawai'i) and Kalihi-Palama Health Center.

Project Director – Nate Meddings (HART)

Mr. Meddings is the Project Director and former Director of Project Controls at HART. Mr. Meddings specializes in complex, pioneering project management and has held key positions in the delivery of Arizona's first transit systems, including light rail and streetcar. Mr. Meddings holds a Bachelor of Science Degree in Construction Management and is a Certified Construction Manager and Project Management Professional. Mr. Meddings started his career in construction field services before program management giving him a fundamental understanding of construction operations and a unique perspective in supporting program delivery.

Senior Project Officer - Robert (Bob) Good (HART)

Mr. Good has over 40 years of project experience in automated rail and transit-oriented projects. Mr. Good earned his electrical engineering degree at Penn State University and has worked in project management on numerous transit systems over the past 30 years. Before coming to HART, Mr. Good was the head of Systems Project Management North America, where he managed all Systems and Automated Projects for Bombardier North America. Mr. Good worked on the London Underground SSL lines, Gautrain Project in South Africa, Edmonton Alberta project, and various automated people mover airport projects around the world.

Director of Construction – Matt Scanlon (HART)

Mr. Scanlon joined HART as the Director of Construction in September 2021. He brings experience in system management, construction management, and transportation engineering. Mr. Scanlon previously worked for HART from 2012 through 2015 as a Project Manager. Between the two positions with HART, Mr. Scanlon served as the Deputy Director for Railroad Systems and Maintenance at Caltrain in San Carlos, California. He has a BS in Civil Engineering from the University of Utah.

Director of Quality Assurance and Quality Control – Trevor Johnson (HART)

Mr. Johnson joined HART in October 2021 as Director of Quality Assurance and Quality Control with over 25 years of experience with the quality department within Boeing Aircraft Manufacturing. During his last three years at the firm, he served as a Quality Director for several of their major programs. He brings an excellent understanding of government regulations, state and federal laws, and industry practices related to quality systems, management, and auditing. He has a BA in law and justice from Central Washington University and a Master of Public Administration in Human Resources Management and Services from the City University of Seattle.

Director of Finance and Administrative Services – Dean Hazama (HART)

Mr. Hazama joined HART in December 2021 as the Director of Finance and Administrative Services. Before joining HART, he served on the HART Board of Directors for two years, including as Chair of the Finance Committee. Mr. Hazama brings extensive experience in financial controls, operations, and administration through his work as a Business Management Officer at the State of Hawai'i Department of Commerce and Consumer Affairs, Management Analyst at the State Department of Transportation Programs, Plans, and Budget Division, and several logistics and managerial roles at the Defense Logistics Agency Maritime Pearl Harbor, the Defense Information Systems Agency Pacific, and Pacific Fleet Integrated Logistics/Technical Support Team. He has been involved with numerous non-profits and boards, including public schools, neighborhood boards, and a planning commission. His education in accounting at the University of Hawai'i is augmented by ongoing training in Lean Sigma, facilities management, and procurement.

Director of Governmental Relations and Public Involvement – Joey Manahan (HART)

Mr. Manahan joined HART in 2021 with a focus on outreach and governmental relations. With a degree in communications from the University of Hawai'i and experience as a local and state elected official, Mr. Manahan is focused on ensuring the Project is communicating clearly and transparently to all stakeholders. He brings decades of public service experience including as a member of the Honolulu City Council and the Hawai'i House of Representatives, serving as Vice Speaker of the House from 2011 to 2012.

Construction Manager – John Ruedisueli (HART)

Mr. Ruedisueli is an experienced project and construction manager with more than 35 years in the construction industry. He currently serves as construction manager for the Project. Mr. Ruedisueli also manages the CE&I engineers and inspectors that monitor and address contractor's issues in a timely manner in order to mitigate risk, cost, and schedule impacts. He has a BS in Construction Engineering and has worked on multiple complex rail transportation systems, bridges, tunnels, highways, and other projects throughout California and Hawai'i.

Chief Engineer – Mike Boomsma (HART)

Mr. Boomsma is a licensed civil professional engineer in Hawai'i with 24 years of industry experience, including ten years on the HART project. Before joining HART, Mr. Boomsma supported 11 other transit and rail authorities with planning, designing, and constructing 200 miles of track and 30 passenger stations in addition to delivering other projects, including bridges, schools, hospitals, highways, and housing. Additionally, he has served as the technical lead for over \$8 billion of design and construction procurements and projects using a variety of design-bid-build (DBB), design-build (DB), and design-build-finance-operate-maintain (DBFOM) delivery methods. He holds a Bachelor of Science Degree in Systems Engineering from the University of Illinois at Urbana-Champaign and earned an MBA from the University of Massachusetts Amherst. Mr. Boomsma is a certified public-private partnership professional (CP3P), a construction document technologist (CDT), and LEED accredited professional.

Director of Project Controls – Aaron Ramirez (HART)

Mr. Ramirez has over 25 years of experience in program and technical project management for software development, as well as project and construction management for civil public works and oil and gas surface and sub-surface infrastructure. Prior to joining HART, he was a Senior Advisor and Consultant to Alyeska Pipeline Service Company Operations and Maintenance Division, leading and consulting on organization development, policy and procedure improvements, and system updates for the 800-mile Trans-Alaskan pipeline. Combined with oil and gas program and construction management experience on the north slope of Alaska, he brings a unique perspective to HART's project control and management team monitoring and controlling overall project performance. Mr. Ramirez holds a Bachelor of Science in Civil Engineering and a Master of Science in Project Management from the University Alaska Anchorage and has previously served as an adjunct professor in the University Alaska project management program.

Director of Planning – Dr. Ryan Tam (HART)

Dr. Tam has a Ph.D. in Urban and Regional Planning from Massachusetts Institute of Technology, a Master of Science Degree in Transportation from Massachusetts Institute of Technology, a Master of Urban Planning from Harvard University, and a Bachelor of Science in Urban and Regional Studies from Cornell University. Over the last 11 years at HART and DTS, Dr. Tam has successfully led the transportation and environmental planning efforts, including project permitting, environmental compliance, multimodal integration, travel demand forecasting, and project development. Dr. Tam serves as HART's representative on the O'ahu Metropolitan Planning Organization Technical Advisory Committee. While at DTS, Dr. Tam consulted on the implementation of hub-and-spoke bus routes and planning for a proposed Bus Rapid Transit system.

Director of Operations & Maintenance – Patrick Preusser (DTS)

Mr. Preusser joined the DTS in 2019 as the Director of Rapid Transit. He administers and directs the activities of the City's multi-modal public and privatized transportation programs. This includes direct administrative oversight of rapid transit assets, operations, safety, security, contract compliance, and maintenance activities across all departmental divisions. Mr. Preusser has full management oversight and responsibility for the multi-modal transportation program including but not limited to bus, rail, and paratransit services and contracted services. Within this role, Mr. Preusser serves as the Director of Readiness and Activation for HART, preparing for the operation of the system. Previously, Mr. Preusser

served as Executive Director, Transportation for the Tri-County Metropolitan Transportation District's transit system where he oversaw bus, light-rail, commuter rail, streetcar, paratransit, and service delivery. He also served as the Executive Officer, Rail Operations for LA Metro, and Senior Rail Advisor for the U.S. Department of Transportation. Mr. Preusser has a master's degree in Public Administration from the University of Southern California and a master's degree in Transportation Management from the University of Denver. He has a certificate in Project Management from the University of California Berkeley and is a certified Project Management Professional by the Project Management Institute. Mr. Preusser's educational background provides a strong framework for his 25 years of transportation experience with large public and private organizations.

Deputy Director of Project Delivery – Vance Tsuda (HART)

Mr. Tsuda graduated with a Bachelor of Science degree in Electrical Engineering from the University of Hawai'i. In 2015 he joined HART as an Electrical Engineer where his role has since evolved into the key interface between the Core Systems Contractor and the Fixed Facility Contractors. Currently, he serves as the Deputy Director of Project Delivery, Integration, and Testing for the portion of the project overseeing the Core Systems Contractor.

Director of Transit Property and Relocation - Krista Lunzer (HART)

Ms. Lunzer earned her bachelor's degree from St. Mary's University and provides over 25 years of land acquisition and relocation compliance oversight. Ms. Lunzer has extensive program management experience ranging from large property acquisition and relocation programs to providing relocation compliance and oversight for FTA, FAA, and HUD-approved programs. As the Director of Transit Property Acquisition and Relocation for HART, Ms. Lunzer provides program management oversight for all property acquisition and relocation activities. Before joining the HART team, Ms. Lunzer served as the Program Manager for the Rhode Island Airport Corporation's Land Acquisition, Relocation, and Avigation Easement Program.

Safety and Security Program Manager – Dave Goeres (HART)

Mr. Goeres began serving as HART's Safety and Security Program Manager in October 2021. He has over 30 years of safety, security, and emergency management experience. He served as the Chief Safety, Security, and Technology Officer (CSSTO) for the Utah Transit Authority – focusing on integrating safety into the Authority's daily operational and construction efforts – and continuing to build UTA's safety culture. He has an excellent understanding of FTA, FRA, and SSOA regulatory requirements, and has put into practice means and methods to meet and exceed those standards and effectively manage Safety Programs. He has a degree in Civil Engineering from the University of Alabama and a Master of Strategic Studies from the US Army War College and holds several relevant certifications including Professional Engineer (Utah and Maryland), Public Transportation Safety Certification Training Program (PTSCTP), Transit Safety & Security Program (TSSP), and Certified Safety & Security Director (CSSD) – WSO.

Board Executive Officer – Cindy Matsushita (HART)

Ms. Matsushita has 20 years of transit experience. Ms. Matsushita currently serves as the HART Board Executive Officer, where she has been the liaison between the HART Board of Directors and HART's Executive Director and CEO since 2012. For ten years prior to that, she performed defense work for the Tri-County Metropolitan Transportation District of Oregon in Portland, Oregon, for bus, light rail, and

paratransit operations, primarily in the area of tort litigation. She holds a JD from Lewis & Clark Law School and a BA in English from UH-Mānoa.

Deputy Director of Project Controls and Risk Manager – Douglas Cullison (HART)

Mr. Cullison has extensive experience in financial controls & risk management in the private and public sectors, including at Accuity, a top-tier local CPA firm. He began his career in public service with the U.S. Navy, before gaining ten years of experience in financial controls and risk management in the private sector, before joining HART in 2013. He became a Po'okela Fellow for the City's Budget & Finance Services in 2009. Mr. Cullison earned a master's degree in accounting and a bachelor's degree with a double major in Finance & International Business from the University of Hawai'i Shidler College of Business.

Deputy Director of Budget and Finance – Brent Lewis (HART)

Mr. Lewis joined HART in October 2021 as the Deputy Director of Budget and Finance. In his role, Mr. Lewis has responsibility for the annual budget, forecasting and managing HART's cash flow requirements, financial reporting, grants management, debt service, and all other aspects of the accounting and financial operation functions. Previously, he worked with the City and County of San Francisco from 2002 through 2016 serving as the Deputy Director, CFO, and IT Director of the Human Resources Department. During this time with the City and County, Mr. Lewis also worked in the Public Works Department on capital and grant-funded projects and performed the budget analysis in the Controller's Office. He most recently served as Vice President at JobAps, Inc. Mr. Lewis received a bachelor's degree from UCLA and a master's degree from Boston University.

Deputy Director of Procurement and Contracts – Dean Matro (HART)

Mr. Matro has worked with HART since 2015. Before being promoted to the role of Deputy Director of Procurement and Contracts in July 2021, he was the Deputy Director of Contract Administration and, initially, a Contracts Manager. Before joining HART, Mr. Matro worked in the areas of contracts and acquisitions for Hawai'i Health Systems Corporation, STI Medical Systems, and BAE Systems. He has a BS in Aeronautical and Astronautical Engineering from the University of Washington and a Masters in Contracting Management from the U.S. Air Force Institute of Technology.

Deputy Director of Construction Claims, Utility & 3rd Party Contracts – David Diamon (HART)

Mr. Diamon serves as the Deputy Director for Construction Claims, Utility, and Third-Party Contracts, following his service as Construction Claims Manager at HART. He brings a decade of experience in contracts, claims, and compliance for large design/build construction projects as well as government/defense projects, coupled with a legal background in business and contracts. He graduated from the University of Wisconsin with a BA in English and a Juris Doctor and is admitted to practice in the Supreme Court of Wisconsin and the United States Federal District Court for the Western District of Wisconsin.

Chief Safety and Security Officer – Eric Fox (DTS)

Mr. Fox joined DTS in 2019 as the Chief Safety & Security Officer. He is a certified safety and security professional with proficiency in safety management and safety and security certifications, with a full understanding of the OSHA standards, the Americans with Disabilities Act, National Fire Protection Association codes, American Public Transportation Association standards, and American National

Standards Institute standards. Mr. Fox is a certified Crime Prevention Through Environmental Design (CPTED) Professional; an authorized Cardiopulmonary Resuscitation, First Aid, and Automated External Defibrillator Instructor for the National Safety Council; and is an OSHA Outreach Trainer for OSHA 500 & 501. Mr. Fox has a deep understanding of OSHA, EPA, USDOT, DHS, FEMA, and FTA compliance, including IS 100, 200, 300, 400, 700, 800 & IS 546 Continuity of Operations, International Organization for Standardization (9001, 14001 and 1801), System Security Awareness for Transit Employees & Strategic Counter-Terrorism Training for Transit Managers, Land Transportation Antiterrorism Training Program XP-LTATP-004, Hazardous Waste Management - RCRA, and Hazardous Materials in Transportation 49 CFR Parts 171-178.

Senior Operations & Maintenance Manager - Steven Bose (DTS)

Mr. Bose joined DTS in 2020 as the Senior Operations & Maintenance Manager. Mr. Bose began his career in rail transportation in 1996. He served as a Transit Rail Power Superintendent and Track and Facilities Chief with King County Metro in Seattle, Washington, before joining DTS. Mr. Bose has developed track inspection and maintenance programs, aerial and tunnel structure inspection programs, on-track safety programs, and employee-in-charge training programs. He supported multiple startup activities for Sound Transit's initial Central Link Light Rail System, Airport Link Extension, University Link Extension, and most recently, the Angle Lake Extension. Mr. Bose's extensive transportation career includes experience in operations, maintenance, construction, and rehabilitation of many rail systems.

Appendix C

Triunity Report: HART Program Cost Estimate & Schedule Assessment



HONOLULU AUTHORITY for RAPID TRANSPORTATION

HART PROGRAM COST ESTIMATE & SCHEDULE ASSESSMENT

Part One: Cost Estimate Assessment Report
Part Two: Schedule Assessment Report
Part Three: Mauka Shift Assessment Report

PREPARED BY
Triunity, Inc.

TRIUNITY

December 3, 2021



PART ONE

COST ESTIMATE ASSESSMENT REPORT

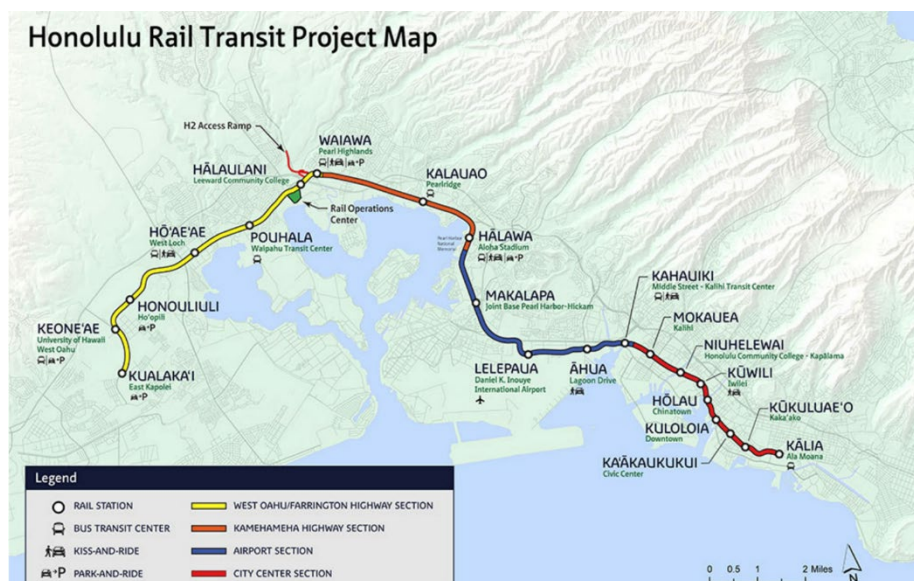
Report Issue Date: December 3, 2021

INTRODUCTION

As the Honolulu Authority for Rapid Transportation (HART) continues towards completion of its large capital program, the Project Team has recently refreshed the overall Estimate at Completion (EAC). This includes costs realized and progress achieved through the first three segments of the Program. The estimate to complete (ETC) primarily includes remaining testing activities in the first two segments, the West Oahu-Farrington Highway segment, and Kamehameha Highway segment. The ETC includes the yet to complete Pearl Highlands Garage, Bus Terminal, and H2 ramp (PHTG) in the first segment, as well as open claim issues being evaluated in the second segment. Approximately 10% of the Airport Section, segment three, is still underway. The majority of the work to complete is in segment four, the City Center. While the work remaining spans the entire Program, the focus of this assessment is the City Center segment.

The Assessment Team performed a top-down assessment on the individual project estimates that make up the remaining scope for the HART Program. The assessment has been conducted utilizing the Team's Subject Matter Experts (SMEs) and organized according to the current reporting structure utilized by the HART Project Team. The goal of the assessment is to provide HART with an independent evaluation of the latest cost estimates and provide an opinion as to the level of appropriateness for the various projects. Since projects are currently at various levels of design and delivery, the assessment is broken into respective sections to capture the program in totality.

The largest effort was assessing the Program's construction cost for reasonableness. The Assessment Team also briefly considered right-of-way and vehicles with the understanding that right-of-way is significantly advanced and vehicles have progressed through procurement and are contracted. The last portion considered was professional services with a major focus on program staffing levels and allocated/unallocated contingencies.



AGENCY

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1.0 Executive Summary

The current EAC for the HART program consists of over 80 Contract Packaging Plans (CPPs) with multiple contracts in each for a total value of over \$11.37 billion. The Assessment Team prioritized efforts based on the contracts that hold the largest monetary value to be spent and the areas of the program that hold the greatest risk. The three major areas of the report are: (1) Guideway, Stations, Support Facilities, Systems and Vehicles, (2) Real Estate and Art Elements, and (3) Professional Services and City and County Participating Departments. Globally, the Assessment Team found HART's EAC to be complete and well managed. The Team also found areas of the EAC that present cost savings opportunities and these findings are summarized in Table 1.0 below and detailed throughout the report.

Group	HART's Current EAC			Assessment Team's Recommendation			Delta
	Base	Contingency	Total	Base	Contingency	Total	
Guideway, Stations, Support Facilities, Systems and Vehicles	\$6,677M	\$1,062M	\$7,740M	\$6,507M	\$836.7M	\$7,343M	\$396.3M
Real Estate and Art Elements	\$646.1M	\$146.6M	\$792.7M	\$646.1M	\$146.6M	\$792.7M	-
Professional Services and City and County Participating Departments	\$2,415M	\$201.5M	\$2,617M	\$2,169M	\$95.5M	\$2,264M	\$352.7M
Unallocated Contingency	-	\$221.7M	\$221.7M	-	\$221.7M	\$221.7M	-
Total	\$9,738M	\$1,632M	\$11,371M	\$9,321M	\$1,301M	\$10,622M	\$749.0M

Table 1.0

1.1 Guideway, Stations, Support Facilities, Systems and Vehicles

- a. **Overview:** The Guideway, Stations, Support Facilities, Systems and Vehicles is the group within the current EAC that holds all incurred and forecasted construction costs. The Assessment Team was provided the Independent Cost Estimate (ICE) for each particular scope of work (contract) to evaluate for reasonableness. This group of the assessment is made up of over 25 contracts, many of which are 100% complete and are summarized in Table 1.1 below in the row titled "All Other + Incurred."

Project	HART's Current EAC			Assessment Team's Recommendation			Delta
	Base	Contingency	Total	Base	Contingency	Total	
City Center Section Guideway and Station Group (CCGS)	\$1,570M	\$277.2M	\$1,848M	\$1,450M	\$217.5M	\$1,668M	\$180.0M
Pearl Highlands Garage, Bus Terminal (PHTG), + H2 Ramp	\$481.8M	\$206.5M	\$688.3M	\$443.0M	\$88.6M	\$531.6M	\$156.7M
City Center Utilities Relocation (CCUR)	\$631.3M	\$177.4M	\$808.7M	\$631.3M	\$177.4M	\$808.7M	-
Core Systems Contract Design-Build-Operate-Maintain (CSC)	\$825.4M	\$173.3M	\$998.7M	\$825.4M	\$173.3M	\$998.7M	-
Waipahu Makai Entrance	\$70.0M	\$30.0M	\$100.0M	\$70.0M	\$21.0M	\$91.0M	\$9.0M
Park-and-ride Lots Construction	\$55.0M	\$36.7M	\$91.7M	\$43.4M	\$13.0M	\$56.4M	\$35.3M

Volt Ampere Reactive Equipment	\$55.0M	\$23.6M	\$78.6M	\$55.0M	\$8.3M	\$63.3M	\$15.3M
All Other + Incurred	\$2,988M	\$137.6M	\$3,126M	\$2,988M	\$137.6M	\$3,126M	-
Total	\$6,677M	\$1,062M	\$7,740M	\$6,507M	\$836.7M	\$7,343M	\$396.3M

Table 1.1

- b. Findings:** Based on the Assessment Team's evaluation, the estimated amount of potential savings for the Guideway, Stations, Support Facilities, Systems and Vehicles group is estimated at \$396.3M. Of this amount, \$170.7M is accounted for in base cost and \$225.6M is accounted for in Allocated Contingency (AC). A detailed analysis of each individual project can be found in Section 3 of this report.

1.2 Real Estate/Right of Way Acquisition

- a. Overview:** Real Estate/Right of Way Acquisition is the section of the current EAC where property acquisition, relocations, and litigation reserves are held. The Assessment Team held interviews with the Project Team to gain knowledge of the system currently being used and to gather all information necessary to perform the assessment. These findings can be found in Table 1.2 below.

Description	Base	Contingency	Total
HART's Current EAC	\$345.3M	\$126.1M	\$471.4M
Assessment Team's Recommendation	\$345.3M	\$126.1M	\$471.4M

Table 1.2

- b. Findings:** Currently, HART is forecasting roughly \$345.3M for property acquisition, relocations, and litigation reserves. With much of the project footprint already identified through design, the risk of a ballooning number of new parcels being required appears negligible. Concurrently, the Real Property Group's formula approach to finding and reporting realistic property values appears appropriate and should mitigate the risk of any underestimation that could not be covered by AC. Further deep analysis could be performed if required at a later date, but at this time the Assessment Team is comfortable with HART's approach.

1.3 Professional Services

- a. Overview:** The Assessment Team evaluated staffing levels from two perspectives; the ability to properly manage owner tasks and risks, and the analysis of how HART staffing compares to other large transit programs. Since the new staffing plan is underway, we focused on that plan for this assessment. Table 1.3 below reflects the implementation of the new staffing plan and recommendations by the Assessment Team described in detail below.

Description	HART's Current EAC			Assessment Team's Recommendation			Delta
	Base	Contingency	Total	Base	Contingency	Total	
Eastside CE& I Services II	\$281.4M	\$31.3M	\$312.7M	\$218.2M	\$10.9M	\$229.1M	\$83.6M
Program Management Support Consultant III	\$206.7M	\$23.0M	\$229.7M	\$138.7M	\$6.9M	\$145.6M	\$84.1M
General Engineering Consultant, Construction (GEC-3)	\$322.9M	\$35.9M	\$358.8M	\$289.5M	\$14.5M	\$304.0M	\$54.8M
Core Systems Contract Oversight Consultant	\$187.3M	\$20.8M	\$208.1M	\$175.7M	\$8.8M	\$184.5M	\$23.6M
Honolulu Staffing, Expenses, & ODC's	\$532.2M	\$59.2M	\$591.4M	\$461.7M	\$23.1M	\$484.8M	\$106.6M
All Other Professional Services + Incurred	\$884.7M	\$31.3M	\$915.8M	\$884.7M	\$31.3M	\$915.8M	-
Total	\$2,415M	\$201.5M	\$2,617M	\$2,169M	\$95.5M	\$2,264M	\$352.7M

Table 1.3

- b. Findings:** The team found efficiencies with the new staffing plan and recommends forecasting the new values in their current EAC. In addition, the team also believes changing the computing formulas (consultant contracts forecasted at 160 hours/month vs. 175 hours/month) is an area that should be considered. Lastly, the AC currently being held at 10% could be reduced to 5% as an additional opportunity for cost savings. The Assessment Team estimates that implementing these three recommendations could save the agency \$352.7M over the span of the program.

1.4 Unallocated Contingency

- a. Overview:** Unallocated Contingency (UC) is typically used to address general project risks that could occur during the construction phase. These are unforeseen conditions such as hyperinflation or depressed workforce that could not have been forecasted. The appropriate UC should be determined by management based on overall project familiarity and risk profile. The Assessment Team's evaluation can be found in Table 1.4 below.

<i>Description</i>	<i>Base</i>	<i>Contingency</i>	<i>Total</i>
HART's Current Unallocated Contingency	-	\$221.7M	\$221.7M
Assessment Team's Recommendation	-	\$221.7M	\$221.7M

Table 1.4

- b. Findings:** Currently, HART's EAC is budgeting \$221.7M for UC. Based on review, the Assessment Team believes this to be appropriate for this stage of the program. A big reason for this is that HART's current EAC has taken a targeted approach through identifying the risk profiles of individual projects and assigning appropriate levels of AC. Other metrics such as UC amounts versus percentage of remaining construction costs and general industry standards were also used in the Assessment Team's evaluation.

2.0 Approach to the Cost Assessment

The Assessment Team performed a high level, top-down assessment on the individual project estimates that make up the remaining scope for the HART Program. The assessment is organized by the latest EAC currently being utilized by the HART Project Team. The goal of the assessment is to provide HART with an independent overall evaluation of the latest cost estimates and provide an opinion as to the level of appropriateness for the various projects. Since projects are currently at various levels of design and delivery, the assessment is broken into various segments as necessary with input from the HART Project Team. The Assessment Team utilized the latest Risk Register to help guide the review of the risk and contingency amounts currently being held for the program. Interviews with the various departments and Project Teams were held and the conclusions drawn from those meetings are presented in this report at various levels of detail.

The current EAC for the HART program consists of over 80 contracts for both costs incurred, and costs forecasted for a total value of over \$11.37 billion. The Assessment Team prioritized efforts based on the contracts that hold the largest monetary value to be spent and the areas of the program that hold the greatest risk. The three major groups of the report are: **(1) Guideway, Stations, Support Facilities, Systems and Vehicles, (2) Real Estate and Art Elements, and (3) Professional Services and City and County Participating Departments.** The Guideway, Stations, Support Facilities, Systems and Vehicles group is the area of the EAC that contains incurred construction costs to date as well as the forecasted capital cost to complete the remaining construction and testing. The Real Estate and Art Elements group contains prior and upcoming costs for property acquisition and relocations and is also where litigation reserves are held. Lastly, the Professional Services and City and County Participating Departments group is where both HART staff and consultant contracts are held. This report is all inclusive and spans across each major element of the program; however, since each major group contains many individual contracts, this report does not comment on each individual contract. Instead, only the contracts that hold significant value or contracts where the Assessment Team's findings significantly differ from what is currently being forecasted in the EAC, were reported.

This assessment is based on a smoothly functioning economic and construction environment, both nationally and locally. The pandemic has resulted in short term disruptions to the market and there is still the potential for unforeseen and longer-term impacts. It is difficult and not advisable to add large amounts of contingency for unknown, future pandemic impacts and HART staff should continue to closely monitor these trends. This assessment is valid only under the terms of a construction environment that could be reasonably forecasted. Such examples include: inflation percentages that can be realistically forecasted by published consumer price index (CPI) and/or producer price index (PPI) data; major scope changes to upcoming projects will be exempt or minimal; and projects will be executed in a competitive bid environment.

3.0 Guideway, Stations, Support Facilities, Systems and Vehicles

3.1 City Center Section Guideway and Station Group

- a. **Overview:** The HART City Center Section Guideway and Station Group (CCGS) is the last of three major segments to HART's capital program. This section consists of over 4 miles of double track beginning at Middle Street at the ewa side and terminating at the Ala Moana Station at the diamond side. Major scope elements include an aerial guideway with eight (8) elevated stations and various street improvements along the corridor. The areas the Assessment Team particularly targeted were construction costs, allowances, markups and other indirect costs, escalation, and contingency. The Assessment Team's evaluation can be found in Table 3.1 below.

Description	Base	Contingency	Total
City Center Section Guideway and Station Group (CCGS)	\$1,570M	\$277.2M	\$1,848M
Assessment Team's Recommendation	\$1,450M	\$217.5M	\$1,668M
Potential Savings	\$120.3M	\$59.7M	\$180.0M

Table 3.1

- b. **Accuracy of Estimate at Completion:** The Assessment Team reviewed the latest independent cost estimate dated July 23, 2020. The estimate included the most recent quantity and plan set takeoffs. HART refreshed the estimate and re-escalated for the revised EAC but the basis did not change from the July 2020 estimate. The Assessment Team believes that this approach was taken based on information related to the recent attempt at a public-private partnership (P3) procurement that resulted in greater than expected bid prices particularly in the areas of General Conditions and Engineering and Design. While partially merited due to the difficulties in the current procurement environment, the Assessment Team believes that the P3 procurement type used as a basis of the refresh should result in a higher cost in these areas than what should be reasonably forecasted for HART's most recent forecasted procurement type of design-build. Therefore, it is suggested that the current values in the base EAC could be reduced presenting a savings opportunity to the program estimated at \$120.3M.
- c. **Risk and Contingency Assessment:** The current amount of AC stands at \$277.2M or 15% of the total value of the contract. It's of the opinion of the Assessment Team that the base estimate, while realistic, also carries a substantial amount of the expected project risk. A reduction in AC from 15% of the total contract value to 15% of the base cost is recommended.

3.2 Pearl Highlands Garage, Bus Terminal (PHTG), + H2 Ramp

- a. **Overview:** The Pearl Highlands Garage, Bus Terminal, and H2 Ramp is a large transit center facility in Segment 1. Major scope elements include a 1,600-stall elevated parking structure, a bus transit center, and various ramps and street improvements. The Assessment Team's evaluation can be found in Table 3.2 below.

Description	Base	Contingency	Total
Pearl Highlands Garage, Bus Terminal (PHTG), + H2 Ramp	\$481.8M	\$206.5M	\$688.3M
Assessment Team's Recommendation	\$443.0M	\$88.6M	\$531.6M
Potential Savings	\$38.8M	\$117.9M	\$156.7M

Table 3.2

- b. **Accuracy of Estimate at Completion:** The current base estimate for this scope of work is \$481.8M. The Assessment Team reviewed the latest independent cost estimate dated July 23, 2020. The estimate included the most recent quantity and plan set takeoffs. HART refreshed the estimate and re-escalated for the revised EAC but the basis did not change from the July 2020 estimate. Once again, the Assessment Team believes that this approach was taken based on information related to the recent attempt at a procurement that resulted in greater than expected bid prices particularly in the areas of General Conditions and Engineering and Design. While partially merited, the amount currently being carried in HART's EAC surpasses the results from the procurement and appears to be a conservative increase to the unit cost particularly in the structural components of the Pearl Highlands Garage. The Assessment Team suggests the current values in the EAC could be reduced presenting a savings opportunity to the program estimated at \$38.8M.

- c. **Risk and Contingency Assessment:** The current AC for this scope of work is \$206.5M. This would account for 30% of the total contract value or 43% of base cost. The Assessment Team believes this is considerably high by both industry metrics and HART's recent procurement efforts and would recommend lowering to 20% of the base cost. This would provide a savings opportunity of an estimated \$117.9M for the program.

3.3 City Center Utilities Relocation (CCUR)

- a. **Overview:** The CCUR project will relocate both wet and dry utilities as well as road improvements as required in advance of the CCGS contract. Major scope elements include wet utilities, dry utilities, roadway improvements, Kapalama utility bridges, traffic signals, street lighting, fiber optic and traffic signal interconnect, and a 138 kV relocation. The areas the Assessment Team particularly targeted were construction costs, allowances, markups and other indirect costs, and escalation. The Assessment Team's evaluation can be found in Table 3.3 below.

Description	Base	Contingency	Total
City Center Utilities Relocation (CCUR)	\$631.3M	\$177.4M	\$808.7M
Assessment Team's Recommendation	\$631.3M	\$177.4M	\$808.7M

Table 3.3

- b. **Accuracy of Estimate at Completion:** The Assessment Team reviewed the latest independent cost estimate dated May 7, 2020. The current estimate sits at \$631.3M without associated contingencies. This estimate has since been refreshed with adjustments to items such as overall project schedule, indirect costs, and general escalation. The Assessment Team believes this number to be derived from the high range of the ICE generated in Q2 of 2020, which was deemed to be thoroughly and sufficiently developed for the level of design detail produced to date.
- c. **Risk and Contingency Assessment:** The current AC being held in the EAC is \$177.4M. This by percentage accounts for 22% of the overall contract amount or 28% of base cost. While this looks conservative by most metrics, this area of the program also holds the most risk and the Assessment Team does not recommend reducing contingency at this time.

3.4 Core Systems Contract Design-Build-Operate-Maintain (CSC)

- a. **Overview:** The HART Core Systems Contract (CSC) is an overarching contract spanning the entire HART program for the supply and installation of the train control, communications, traction power, and station systems. The contract also supplies 80 trains and holds the operations and maintenance of the system for a 5-year period. The contractor is performing satisfactorily as the civil contractors open areas for the systems to progress. The evaluation of the CSC was centered around a review of the remaining risk to completion of the contract instead of a full project scope review. The Assessment Team held discussions with the CSC project management. The topics discussed ranged from contractor performance to the structure of the delay change order and the payment milestones. The Assessment Team's evaluation can be found in Table 3.4 below.

Description	Base	Contingency	Total
Core Systems Contract Design-Build-Operate-Maintain (CSC)	\$825.4M	\$173.3M	\$998.7M
Assessment Team's Recommendation	\$825.4M	\$173.3M	\$998.7M

Table 3.4

- b. **Accuracy of Estimate at Completion:** As the contract was signed in 2011 there have been significant delays to the overall project. To address the delays, a \$160M change order was executed in late 2018. Based on the information provided, the Assessment Team believes the current values carried in the EAC to be appropriate.
- c. **Risk and Contingency Assessment:** The future delay claims pose the largest risks remaining for the CSC. The HART staff's approach to mitigating the delay claims is well reasoned considering the unusual challenges that the program delays present to this overarching systems contract. The allocated risk for delays to the systems contractor for Segment 2 is currently \$30M. The AC appears sufficient for the delays the systems contractor will experience from the civil contracts. The CSC is typical for major construction projects. Major changes are negotiated for scope and compensation. The onus of the change falls to the CSC project management to negotiate. The project management team has the responsibility to determine the best approach to manage the CSC contractor and the strategy to limit HART exposure for future delays.
- d. **Additional Comments:** Due to the delays of the program the segments will be opened in a different manner than originally planned. One effect this may produce is an increased cost to test and open Segment 2 while Segment 1 is operational. Systems testing is challenging under normal circumstances and when short windows, nights and weekends are added into

the mix, costs can climb quickly due to premium labor for craft and increased overheads to cover both day and night shifts. COVID-19 has introduced further uncertainty in terms of escalation and material procurement delays. Copper has risen significantly since COVID-19; however, it is historically very similar in price to when the CSC was executed. One large risk that has been mitigated is all the train control equipment is on site. The initial large change order that was executed with the CSC included payments for completed milestones in Segments 2 and 3. The CSC contractor is experiencing challenges of their own which may help HART to mitigate (concurrent) delay claims allegedly caused by the civil contracts.

3.5 Waipahu Makai Entrance

- a. **Overview:** The Assessment Team reviewed the Waipahu Makai Entrance contract which consists of three various scopes of work described below:
- **Waipahu Transit Center Makai Entrance Module & Stairs:** Construction of a fare gate entrance building to the Makai side of the Waipahu Station. The entrance building will be elevated to bring the entrance level to the same elevation as the elevator first floor level, giving the public access to the entrance module from the surrounding site grade.
 - **UHWO Station East Entrance Building:** Construction of a permanent east entrance building and an elevated pedestrian bridge on the east side of the guideway platform at the UHWO Station. The pedestrian bridge will be elevated at the concourse level to allow the public access to the guideway platform.
 - **Keone'ae Station at UHWO:** Construction of a 1,000-stall asphalt parking lot and bus transit center. The construction includes asphalt paving, pavement markings, landscaping, lighting and security, concrete bus parking, concrete curbs/sidewalks, and bus shelters.

The Assessment Team's evaluation can be found in Table 3.5 below.

<i>Description</i>	<i>Base</i>	<i>Contingency</i>	<i>Total</i>
HART's Waipahu Transit Center Makai Entrance Module & Stairs	\$10.8M	\$4.6M	\$15.4M
UHWO Station East Entrance Building	\$37.4M	\$16.0M	\$53.4M
Keone'ae Station at UHWO	\$21.4M	\$9.2M	\$30.6M
Waipahu Makai Entrance Total	\$70.0M¹	\$30.0M¹	\$100.0M¹
Assessment Team's Recommendation	\$70.0M	\$21.0M	\$91.0M
Potential Savings	\$0M	\$9.0M	\$9.0M

1 – Total has been rounded and reflects the amount carried in the EAC.

Table 3.5

- b. **Accuracy of Estimate at Completion:** The three estimates making up this contract total \$70.0M. The Assessment Team reviewed the independent cost estimates for each of the three projects and believe them to be appropriate for this level of design.
- c. **Risk and Contingency Assessment:** The current contract holds a 30% AC based on overall contract value (43% of base cost) and is viewed by the Assessment Team as conservative. While the projects lack more than 15% design, each independent cost estimate already carries a design contingency in the base cost. The Assessment Team recommends lowering the AC to 30% of base cost resulting in a reduction of \$9.0M to the EAC.

3.6 Park-and-ride Lots Construction

- a. **Overview:** The Assessment Team reviewed the Park-and-Ride Lots Construction contract which consists of three various scopes of work described below:
- **Kualakai Station at East Kapolei:** Construction of an east entrance building and an elevated pedestrian bridge on the west side of the guideway platform at the Kualakai Station. The pedestrian bridge will be elevated at the concourse level to allow the public access to the guideway platform.
 - **East Kapolei Parking Lot:** Construction of a 958-stall parking lot at East Kapolei. The construction includes asphalt paving, pavement markings, landscaping, lighting and security, concrete curbs/sidewalks, bus shelters, access roads, and the Keahumoa Roadway Extension.
 - **Ho'opili Park-and-Ride Electrical:** Electrical work for the Ho'opili Park-and-Ride including installation of 11,200 feet of electrical underground conduit, 65 each handholes, extensions and connections to the station's TCCR room.

The Assessment Team's evaluation can be found in Table 3.6 below.

<i>Description</i>	<i>Base</i>	<i>Contingency</i>	<i>Total</i>
Kualakai Station at East Kapolei	\$23.1M	\$15.4M	\$38.5M
East Kapolei Parking Lot	\$14.5M	\$9.7M	\$24.2M
Ho'opili Park-and-Ride Electrical	\$0.84M	\$0.56M	\$1.4M
Park-and-ride Lots Construction Total	\$55.0M¹	\$36.7M¹	\$91.7M¹
Assessment Team's Recommendation	\$43.4M	\$13.0M	\$56.4M
Potential Savings	\$11.6M	\$23.7M	\$35.3M

1 – Total reflects the amount carried in the EAC.

Table 3.6

- b. Accuracy of Estimate at Completion:** The current estimate at completion is \$55.0M which exceeds the ICEs reviewed by the Assessment Team by the amount of \$16.6M. Based on previous conversation with HART staff, it is understood that \$5.0M was added to the EAC to account for the construction of the Ho'opili Park-and-Ride; however, there remains a gap of \$11.6M between the EAC and the ICEs provided. The Assessment Team believes that a more reasonable dollar amount for the base estimate should be around \$43.4M based on the information provided. This would account for a reduction of \$11.6M in base cost.
- c. Risk and Contingency Assessment:** Currently carrying \$36.7M in AC which equates to 40% of the total contract value (67% of base cost) and is viewed as very conservative by the Assessment Team. It is recommended that the contingency percentage be reduced to 30% of base cost. Using the recommended base estimate of \$43.4M, the new AC is recommended at \$13.0M. This would account for an additional reduction of \$23.7M.
- d. Recommendations:** Based on the information provided, the total potential savings is \$35.3M. However, this appears to be a "catch all" contract. It is recommended that the HART team clearly identify the scope of this contract and update the EAC as necessary.

3.7 Volt Ampere Reactive Equipment

- a. Overview:** Electrified light rail systems typically power the traction power substations with a dedicated power feed. The HECO feeds for the substations are shared among multiple clients. HECO is required to maintain a level of power quality for all customers and traction power substations may cause the power to fluctuate outside of the established limits. The mitigation strategy is to provide equipment to keep the power feed within the established limits. The responsibility to mitigate these effects has been negotiated between HECO and HART over the years. The latest HART leadership team has agreed to install the equipment at HART's expense. The Assessment Team's evaluation can be found in Table 3.7 below.

<i>Description</i>	<i>Base</i>	<i>Contingency</i>	<i>Total</i>
HART's Current EAC	\$55.0M	\$23.6M	\$78.6M
Assessment Team's Recommendation	\$55.0M	\$8.3M	\$63.3M
Potential Savings	\$0M	\$15.3M	\$15.3M

Table 3.7

- b. Accuracy of Estimate at Completion:** The HART engineering team has developed technical solutions with associated engineering estimates of \$55.0M. The procurement is planned to be a DBOM due to the unique nature of the equipment. The engineering estimate includes scope to design, build, operate and maintain the STATCOM VVO equipment and it also includes possible ROW acquisition and changes to the civil and CSC to integrate the new equipment. The estimates appear conservative but due to the nature of the work and the vaguely defined scope, the Assessment Team does not recommend changing the base cost at this time.
- c. Risk and Contingency Assessment:** The current AC for this contract is \$23.6M. This accounts for 30% of total contract value and 43% of base cost. After reviewing the engineering estimates, it appears that a substantial amount of contingency is already built into the base cost. The Assessment Team recommends reducing the AC to 15% of base cost resulting in a potential savings of \$15.3M for the program.

4.0 Real Estate and Art Elements

4.1 Real Estate/Right of Way Acquisition

- a. **Overview:** The real property group at HART has processes and procedures that appear to be mature and complete. The HART team uses a combination of assessed values, adjustment factors for both full property takes and construction easements, and relocation expenses to forecast the expected budget for the program. The team's attention to detail and flexibility of consistently updating their formulas should lead to an accurate estimate of forecasted cost. The overall approach to both acquiring real estate and mitigating damages is seen by the Assessment Team to be at or above industry standards.

The Assessment Team's evaluation can be found in Table 4.1 below.

<i>Description</i>	<i>Base</i>	<i>Contingency</i>	<i>Total</i>
HART's Current EAC	\$345.3M	\$126.1M	\$471.4M
Assessment Team's Recommendation	\$345.3M	\$126.1M	\$471.4M

Table 4.1

- b. **Accuracy of Estimate at Completion:** Currently, HART is forecasting roughly \$345.3M for property acquisition, relocations, and litigation reserves. With much of the project footprint already identified through design, the risk of a ballooning number of new parcels being required appears negligible. Concurrently, the real property group's formula approach to finding and reporting realistic property values appears appropriate and should mitigate the risk of any underestimation that could not be covered by the forecasted AC.
- c. **Risk and Contingency Assessment:** Currently, HART is carrying roughly \$126.1M in AC or 26% of the forecasted contract amount. Due to the nature and sensitivity of the real estate market, it has been found that this category of the estimate typically carries a higher percentage of contingency. Through interviews with right-of-way (ROW) staff, it was identified that the most recent appraisal was early 2020. This may account for the largest risk for this category as it is unclear how the effects of higher-than-expected economic volatility due to COVID-19 could impact real estate prices.
- d. **Recommendations:** The Assessment Team performed the ROW evaluation at a high level without the use of a local real estate expert and found no significant recommendations for this group. After interviews with staff, it's clear that this group is well qualified to handle the upcoming needs in this category. Both base cost and AC appear to forecast reasonable expectations and appear appropriate for this stage of the program

5.0 Professional Services and City and County Participating Departments

5.1 Professional Services Overview

- a. **Overview:** Large capital programs like HART typically see their Professional Services account for 20-40% of construction costs. Despite the magnitude of this dollar value, this category, which is critical to program delivery, can often be overlooked. For this report, the Assessment Team focused primarily on agency staffing and consultant contracts since it makes up the bulk of the remaining cost to the program. Rail transit programs have become very large and complex and the need for adequate management and staffing with the skills and experience to address these challenges cannot be underestimated. In addition, it is imperative to find the right balance for the program as too many personnel can lead to inefficiencies and unproductive activities.

The Assessment Team evaluated staffing levels from two perspectives; the ability to properly manage owner tasks and risks, and the analysis of how HART staffing compares to other large transit programs. Since the new staffing plan is underway, we focused on the new plan for this assessment. Table 5.1 reflects the implementation of the new staffing plan and other suggestions by the Assessment Team described in detail below.

Description	HART's Current EAC			Assessment Team's Recommendation			Delta
	Base	Contingency	Total	Base	Contingency	Total	
Eastside CE& I Services II	\$281.4M	\$31.3M	\$312.7M	\$218.2M	\$10.9M	\$229.1M	\$83.6M
Program Management Support Consultant III	\$206.7M	\$23.0M	\$229.7M	\$138.7M	\$6.9M	\$145.6M	\$84.1M
General Engineering Consultant, Construction (GEC-3)	\$322.9M	\$35.9M	\$358.8M	\$289.5M	\$14.5M	\$304.0M	\$54.8M
Core Systems Contract Oversight Consultant	\$187.3M	\$20.8M	\$208.1M	\$175.7M	\$8.8M	\$184.5M	\$23.6M
Honolulu Staffing, Expenses, & ODC's	\$532.2M	\$59.2M	\$591.4M	\$461.7M	\$23.1M	\$484.8M	\$106.6M
All Other Professional Services + Incurred	\$884.7M	\$31.3M	\$915.8M	\$884.7M	\$31.3M	\$915.8M	-
Total	\$2,415M	\$201.5M	\$2,617M	\$2,169M	\$95.5M	\$2,264M	\$352.7M

Table 5.1

The average full-time equivalents (FTE) through 2030 that were derived from this plan are as follows:

Previous Staffing Plan		New Staffing Plan	
Year	FTE	Year	FTE
2021	189	2021	162
2022	169	2022	133
2023	157	2023	122
2024	124	2024	102
2025	165	2025	132
2026	166	2026	135
2027	155	2027	129
2028	138	2028	114
2029	104	2029	91
2030	104	2030	91

- b. Accuracy of Estimate at Completion:** The Assessment Team did not identify gaps or obvious deficiencies for any specific discipline in the new staffing plan. The overall staffing numbers, given the complexity of this program and the challenges of maintaining personnel in Hawaii, are consistent with other rail mega-projects of this scale including those for LA Metro. However, there is a gap between the new projected staffing numbers and what is currently being carried in the latest EAC. Further, in translating the overall detailed staffing projections into costs, certain elements of conservatism were observed. For example, the estimate uses 175 hours worked for each position and each month throughout the life of the contract. The FTA typically recommends 160 hours as more reflective of actual conditions. This has a significant cumulative impact over the life of the program, resulting in a savings of approximately \$246.7M if applied with the most recent staffing reduction plan.
- c. Risk and Contingency Assessment:** Each consulting contract is currently assigned a 10% AC in the EAC. Contingency is applied to address unforeseen conditions over the long timeframe of the program. In this estimate, most of the consultants are serving as an extension of staff with a detailed position by position projection. It is unlikely that the staff projections will need an order of magnitude increase, particularly given HART's recent experience in successfully reducing and managing staffing levels. However, given the unpredictable nature of long-running mega-projects, some level of contingency is warranted. The Assessment Team recommends that HART reassess its 10% AC for consultant contracts and consider an AC of 5%. This reduction would provide an additional savings of \$106.0M, assuming all other recommendations are implemented.
- d. Recommendations:** The Assessment Team believes overall staffing levels that are planned and budgeted are sufficient to manage and oversee the program, and consistent with other large rail mega-projects. Strategies to reduce the overall length of the program should be vigorously pursued, where feasible, as a shorter schedule will bring a commensurate reduction in costs for professional services. In many cases, this reduction can help fund contractor acceleration strategies and agreements. HART should continue to work closely with the FTA in its ongoing Management Capacity and Capability assessments and respond appropriately in filling critical positions.

5.2 Eastside CE&I Services

Description	Base	Contingency	Total
HART's Current EAC	\$281.4M	\$31.3M	\$312.7M
Assessment Team's Recommendation	\$218.2M	\$10.9M	\$229.1M
Potential Savings	\$63.2M	\$20.4M	\$83.6M

Table 5.2

- a. Accuracy of Estimate at Completion** Currently, the EAC is valuing this contract at \$281.4M, which is a combination of both already incurred costs and the forecasted cost to complete. The Assessment Team views this as conservative and through conversations with the HART project team it's now known that an overall reduction to this contract is currently underway in the forecasted amount of \$50.9M. In addition, while evaluating the staffing plan it was recognized that HART is currently budgeting full-time staff at 175 hours per month. The Assessment Team recommends reducing this to 160 hours a month which fall within industry standards. Applying this would reduce the EAC amount by an additional \$12.3M over the life of the contract.
- b. Risk and Contingency Assessment:** Currently, the AC amount of this contract stands at \$31.3M or 10% of the estimated total contract amount. The HART project team appears to have a great handle on their staffing needs and therefore the Assessment Team recommends reducing AC to 5% of the estimated base contract amount. Assuming all other recommendations are implemented, this would account for an additional \$20.4M savings to the program.

5.3 Program Management Support Consultant

Description	Base	Contingency	Total
HART's Current EAC	\$206.7M	\$23.0M	\$229.7M
Assessment Team's Recommendation	\$138.7M	\$6.9M	\$145.6M
Potential Savings	\$68.0M	\$16.1M	\$84.1M

Table 5.3

- a. Accuracy of Estimate at Completion:** Currently, the EAC is valuing this contract at \$206.7M, which is a combination of both already incurred costs and the forecasted cost to complete. The Assessment Team views this as conservative

and through conversations with the HART project team it's now known that an overall reduction to this contract is currently underway in the forecasted amount of \$59.5M. In addition, while evaluating the staffing plan it was recognized that HART is currently budgeting full-time staff at 175 hours per month. The Assessment Team recommends reducing this to 160 hours a month which fall within industry standards. Applying this would reduce the EAC amount by an additional \$8.5M over the life of the contract.

- b. Risk and Contingency Assessment:** Currently, the AC amount of this contract stands at \$23.0M or 10% of the estimated total contract amount. The HART project team appears to have a great handle on their staffing needs and therefore the Assessment Team recommends reducing AC to 5% of the estimated base contract amount. Assuming all other recommendations are implemented, this would account for an additional \$16.1M savings to the program.

5.4 General Engineering Consultant, Construction

Description	Base	Contingency	Total
HART's Current EAC	\$322.9M	\$35.9M	\$358.8M
Assessment Team's Recommendation	\$289.5M	\$14.5M	\$304.0M
Potential Savings	\$33.4M	\$21.4M	\$54.8M

Table 5.4

- a. Accuracy of Estimate at Completion:** Currently, the EAC is valuing this contract at \$322.9M, which is a combination of both already incurred costs and the forecasted cost to complete. The Assessment Team views this as conservative and through conversations with the HART project team it's now known that an overall reduction to this contract is currently underway in the forecasted amount of \$13.2M. In addition, while evaluating the staffing plan it was recognized that HART is currently budgeting full-time staff at 175 hours per month. The Assessment Team recommends reducing this to 160 hours a month which fall within industry standards. Applying this would reduce the EAC amount by an additional \$20.2M over the life of the contract.
- b. Risk and Contingency Assessment:** Currently, the AC amount of this contract stands at \$35.9M or 10% of the estimated total contract amount. The HART project team appears to have a great handle on their staffing needs and therefore the Assessment Team recommends reducing AC to 5% of the estimated base contract amount. Assuming all other recommendations are implemented, this would account for an additional \$21.4M savings to the program.

5.5 Core Systems Contract Oversight Consultant

Description	Base	Contingency	Total
HART's Current EAC	\$187.3M	\$20.8M	\$208.1M
Assessment Team's Recommendation	\$175.7M	\$8.8M	\$184.5M
Potential Savings	\$11.6M	\$12.0M	\$23.6M

Table 5.5

- a. Accuracy of Estimate at Completion:** Currently, the EAC is valuing this contract at \$187.3M, which is a combination of both already incurred costs and the forecasted cost to complete. The Assessment Team views this as conservative and through conversations with the HART project team it's now known that an overall reduction to this contract is currently underway in the forecasted amount of \$325K. In addition, while evaluating the staffing plan it was recognized that HART is currently budgeting full-time staff at 175 hours per month. The Assessment Team recommends reducing this to 160 hours a month which fall within industry standards. Applying this would reduce the EAC amount by an additional \$11.3M over the life of the contract.
- b. Risk and Contingency Assessment:** Currently, the AC amount of this contract stands at \$20.8M or 10% of the estimated total contract amount. The HART project team appears to have a great handle on their staffing needs and therefore the Assessment Team recommends reducing AC to 5% of the estimated base contract amount. Assuming all other recommendations are implemented, this would account for an additional \$12.0M savings to the program.

5.6 Honolulu Authority for Rapid Transit Labor, Expenses and Other Direct Costs

<i>Description</i>	<i>Base</i>	<i>Contingency</i>	<i>Total</i>
HART's Current EAC	\$532.2M	\$59.2M	\$591.4M
Assessment Team's Recommendation	\$461.7M	\$23.1M	\$484.8M
Potential Savings	\$70.5M	\$36.1M	\$106.6M

Table 5.6

- a. **Accuracy of Estimate at Completion:** Currently, the EAC is valuing this contract at \$532.2M, which is a combination of both already incurred costs and the forecasted cost to complete. The Assessment Team views this as conservative and through conversations with the HART project team it's now known that an overall reduction to this contract is currently underway in the forecasted amount of \$70.5M. The Assessment Team recommends proceeding with the staffing plan reductions in progress.
- b. **Risk and Contingency Assessment:** Currently, the AC amount of this contract stands at \$59.2M or 10% of the estimated total contract amount. The HART project team appears to have a great handle on their staffing needs and therefore the Assessment Team recommends reducing AC to 5% of the estimated base contract amount. Assuming all other recommendations are implemented, this would account for an additional \$36.1M savings to the program.

6.0 Conclusion

The Assessment Team performed a high level, top-down assessment on the individual project estimates that make up the remaining scope for the HART Program. The most significant findings were opportunities for potential savings to the program, particularly in areas of forecasted construction costs and professional services. Globally, the HART program appears to be well managed, and any upcoming challenges are at the forefront, and are reflected in the current EAC. Examples of this are the targeted approach to AC and the management of the program's Risk Register. Many large programs rely too heavily on UC which by nature is less targeted and can lead to ballooning of program costs if not properly managed. The Assessment Team did find several areas within the various EAC groups that costs appear to be forecasted with conservatism. It is suggested that the Project Team investigate these findings and update the current EAC as necessary.



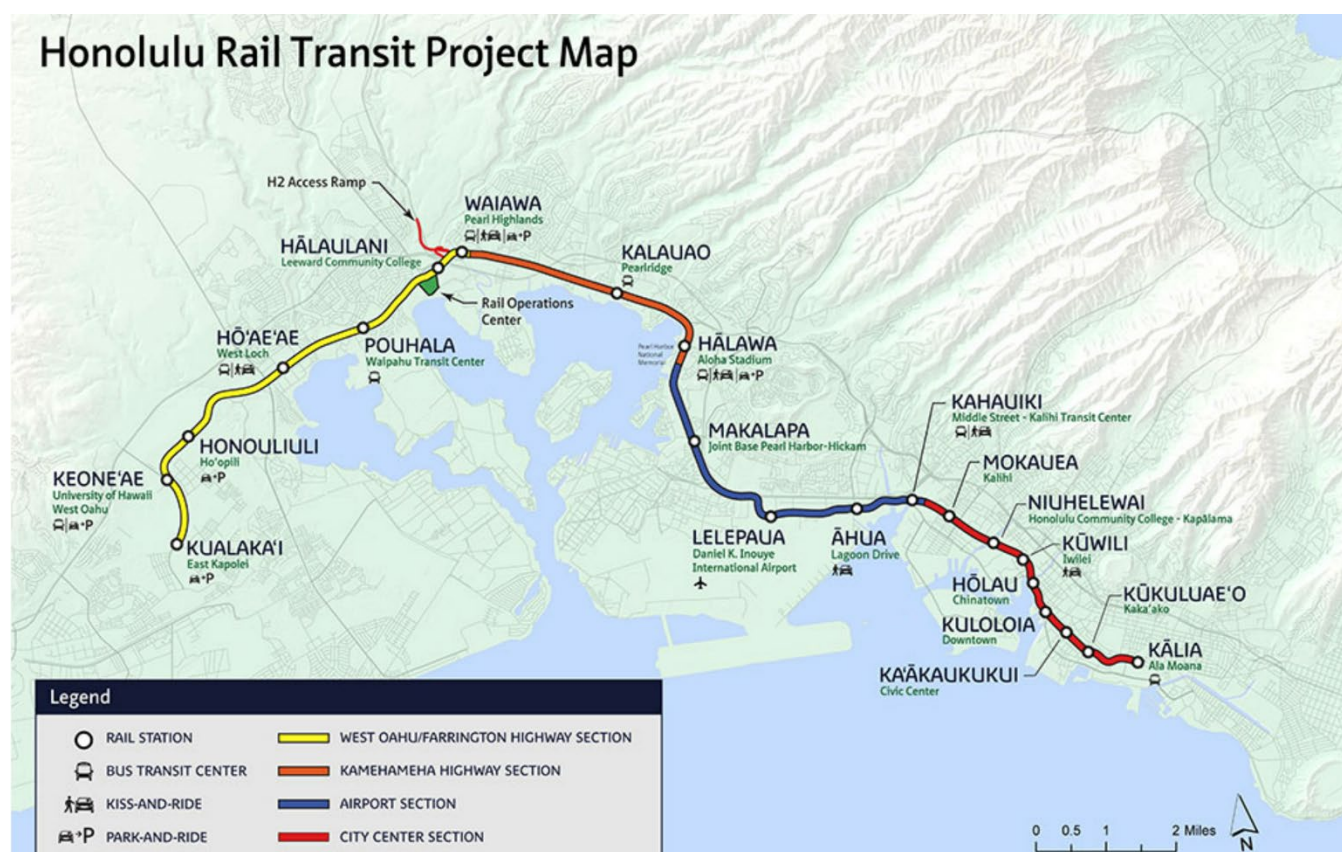
PART TWO

SCHEDULE ASSESSMENT REPORT

Report Issue Date: December 3, 2021

INTRODUCTION

As the Honolulu Authority Rapid Transportation (HART) Program (Program) continues towards completion, the Project Team has recently refreshed the overall Master Project Integrated Schedule (MPIS). This includes progress achieved through the first three segments of the Program. The schedule to complete primarily includes remaining core systems installation, testing and integration activities in the first two operating segments, the combined West Oahu-Farrington Highway section, plus the Kamehameha Highway section is now being considered Operational Segment 1 – Westside. The work remaining in the second segment, Operational Segment 2 – Airport, is the final stretch of guideway approaching and including the Kahauiki Station at Middle St. (last station at the east end of the segment), followed by the core systems installation, integrated testing, and commissioning. And the last operational segment, Segment 3 – City Center, has only begun some preliminary utility relocation work, with the bulk of the work remaining to be procured and constructed over the next 8-10 years. While there is work remaining in all 3 segments of the Program, the majority of focus for this assessment will be on Segment 3 – City Center, as it has the most exposure to remaining risks and uncertainty for schedule impacts and delays.



The Assessment Team assessed the program's MPIS for reasonableness and performed a top-down assessment of the individual project/contract schedules that make up the remaining scope for the Program. The assessment has been conducted utilizing the Team's subject matter experts (SME's) and the goals of the assessment are to provide HART with an evaluation of the latest completion schedules and provide an opinion as to the level of appropriateness for the various projects. Since projects are currently at various levels of design and delivery, the assessment will be broken into the 3 operational segments being turned over to Honolulu Department of Transportation Services (DTS) in succession.

The Assessment Team will briefly consider right-of-way and vehicles procurement schedules with the understanding that right-of-way acquisitions are significantly advanced ahead of the need for construction, and vehicles have progressed through procurement and are contracted for delivery to support testing and operations. After the critical paths for design and construction are evaluated, the remaining schedule activities to be considered are for professional services only as a level of effort, and the allocated/unallocated risk contingency activities as they are represented within the critical path by a duration

placeholder activity only, or added at the end of each critical path to operational readiness. To perform this final step of the schedule assessment, the Team will concurrently be examining the program schedule, claims log, and risk registers for remaining projects.

Reviews of the cost Estimate-at-Complete or EAC (as it relates to the schedule), claims, and risk register will be performed at a high-level, targeted to assist in the overall schedule assessment. In-depth schedule analysis for existing claims and risk will not be performed at this time.

List of Acronyms:

AGS – Airport Guideway and Stations (contract)
CBS – Cost Breakdown Structure
CCC – Change Control Committee
CCGS – City Center Guideway and Stations (contract)
CCUR – City Center Utilities Relocation (contract)
CPM – Critical Path Method (schedule technique)
CSC – Core Systems Contract(or)
DTS – Department of Transportation Services (City and County of Honolulu)
EAC – Estimate-at-Complete (cost forecast technique)
EPS – Enterprise Project Structure (in Primavera P6)
HRH – Hitachi Rail Honolulu (Core Systems Contractor)
KHG – Kamehameha Highway Guideway section
MPIS – Master Project Integrated Schedule
OBS – Organization Breakdown Structure
PMP – Project Management Plan
P6 – Primavera Project Planner (Enterprise scheduling software)
STG – Shimmick/Traylor/Granite (Joint Venture Contractor)
WBS – Work Breakdown Structure
WOFH – West Oahu-Farrington Highway (guideway) section

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1.0 Executive Summary

Analyzing the trends of actual schedule progress against the original baseline “planned” schedule for the Airport Guideway and Stations (AGS) project, the HART Program has clearly encountered more schedule delay events and resourcing challenges than was ever anticipated by the early HART project management teams. The earned value and actual cost profile curves (see *Section 14.3, S-Curves*) indicate that the baseline production rates required to stay within the early/late (“on-schedule”) envelope were not ever achieved. However, analyzing the latest forecast curves, current CPM schedules used for forecasting the remaining contracts to complete, and a robust list of evaluated risks (either mitigated or managed), it is apparent the lessons learned and actual production rates proven thus far have been adequately modeled program wide for more realistic (probability of achievement) completion schedules to meet the following revised Operational Readiness Dates for Segments 1, 2 and 3. It should also be noted that Segment 1 will be the first experience of LRT operations for HART and DTS and we have not assessed the complexities of Operational turn-over from HART to DTS for revenue service.

Segment:	Operational Readiness Date:
1 - Westside	April 2022 (not risk adjusted)
2 - Airport	March 2024 (not risk adjusted)
3 - City Center	October 2029 (risk adjusted March 2031)

Table 1.0

The Assessment Team recommends HART coordinate with DTS to produce a detailed plan for transitioning the Segment 1 Operations from Operational Readiness (OR) into Revenue Service. We understand that a Revenue Service Operations date (open service to the public) has not yet been determined.

With only six months left to Segment 1 OR date, there are still risks concerning the weld modifications and wheel replacements; however, HART indicated that the system could operate safely while the wheel replacement modifications took place over the first 1-2 years of service.

The Assessment Team further recommends HART perform more in-depth and continuous analysis of resource requirements and achievable planned production rates, especially pertaining to critical path production activities such as guideway girder/station platform erection and systems integration testing. We also recommend adding interim event and hand-over milestones (payment milestones and incentives) built into the remaining contracts for completing significant phases of the work along the critical path(s) to OR.

2.0 General Findings and Approach to Evaluating the Schedule

The Assessment Team's general finding is that the CPM Master Schedule is completely modeled in a single Primavera P6 database, inclusive of all contractors' as-built schedules to date (completed or in-progress) as well as all planned schedules (HART fragnets) for any future contracts remaining to be procured. All schedules are cost-loaded to the extent that HART has developed or captured all available cost estimate-to-complete data. While most schedules are not resource-loaded, the major critical path items in the schedules are resource-driven using resource-sequencing logic, and are also quantity loaded with major production units. (For example: City Center Utility Relocation current schedule is quantity loaded for linear feet, sq ft, etc.) We also evaluated HART's schedules against the following [FTA Oversight Procedure OP34 -Project Schedule Review criteria](#) and found them to be in compliance:

- Completeness and reliability of the Sponsor's project schedule.
- Usefulness as a management tool.
- Extent to which the project schedule reflects the project scope, cost, management practices, and method of project delivery.
- Whether the Sponsor's schedule management and project schedule are sufficient to plan and control the project time at the programmatic and contract level and complement the management of scope, cost, and risk.

We reviewed the project control organization, schedule development, and control process and procedures and found them to be in accordance with best industry practices. HART's scheduling team has the experience and qualifications required to manage the remaining program (*see Section 10. Staffing Evaluation*). The Basis of Schedule is also adequate. It was last formally updated with the Airport Segment re-baseline effort and is currently being updated again along with the Program Management Plan (PMP) and City Center Segment revised schedule and procurement plan.

In addition to reviewing the current and baseline versions of all electronic CPM schedules in HART's Primavera (P6) database, the HART Project Controls staff also provided access to the HART Project GIS for planning and design as well as the following planning and analysis documents for our review:

- Critical Path reports for all 3 Segments
- MPS Cost-loaded Summary Schedules (for comparison with respective contracts and remaining cost estimates)
- P3 Bidders Schedule Comparisons
- Project Earned Value S-curves
- AGS Productivity Metrics
- CCUR Task Orders by Areas (for comparison with CCUR critical path schedule)
- AGS HECO and 3rd Party Utility Relocation TIAs

Our approach to evaluating the Master Schedule and constituent detailed schedules was to first assess the Work Breakdown Structure (WBS) structures against the major scope elements (guideway, stations, systems, etc.), locations (segments and areas), and lifecycle phases (design, procurement, construction, integration and testing). We evaluated the resource allocations, their assumed crews, and production rates which determined the durations and concurrency of the activities. Lastly, we assessed the critical path logic and durations for each segment required to reach OR. We also evaluated the contractual schedule specifications and HART's process for monitoring and planning schedule contingency based on risks.

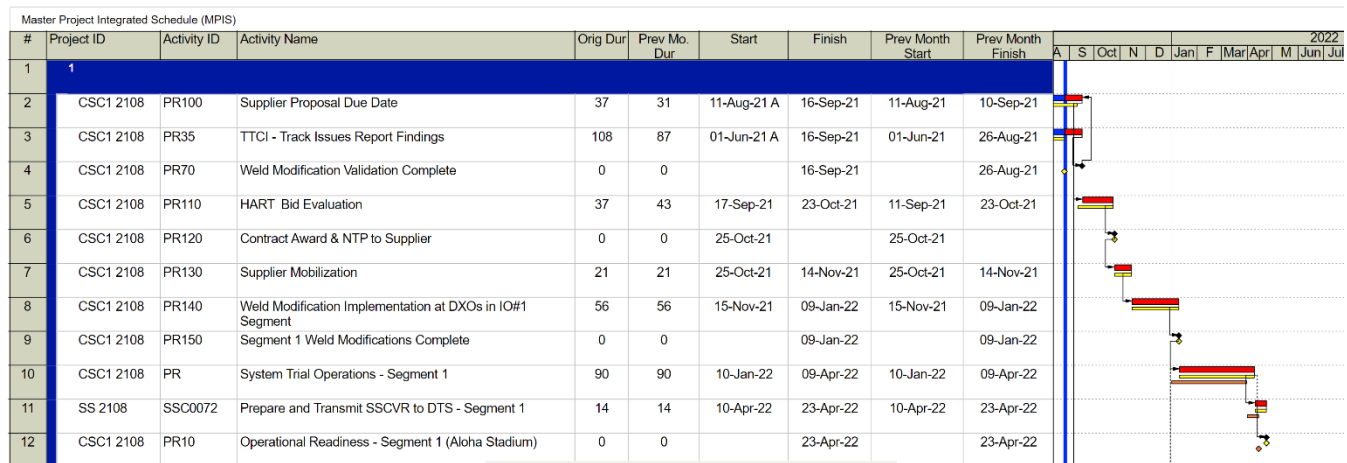
3.0 Critical Path

Overall, the critical path is driven by the logical flow and availability of design and construction trade resources (see *Section 11. Production Rates*) beginning from the west end of Segment 1 and moving east through the Airport Segment 2 and ending with the City Center Segment 3. The critical sequence of major work activities follows a typical path of design/re-design, row acquisitions/access/permitting, utility relocations, sitework preparations, foundations, columns, guideway structure, stations, trackwork, core systems, integration, and OR testing.

Segment 1 (Westside)

Currently 95% complete with construction, the remaining critical path to OR is completion of weld modifications (resulting from rail/wheel interface design issue) to the DF Track and crossovers, followed by three months of trial operations and two weeks for final Safety and Security Certification transmittal to DTS. The OR date for Segment 1 is currently being forecast for April 2022. With only six months left to Segment 1 OR date, we would not expect any remaining float contingency, however there are still risks concerning the first HART segment to experience beginning service operations, and the transfer of Operations from HART to DTS.

Regarding the wheel replacements, HART indicated that the system could operate safely while those modifications happened over the first 1-2 years of service.



Sample of Segment 1 Critical Path Activities

Segment 2 (Airport)

Currently 75% complete, the remaining critical path to Operational Readiness is completion of aerial utility relocation, followed by completing the last column required to finish the guideway and the last station under construction near the east end (Ahua Station at Lagoon Drive), followed by 18 months of core systems installation, integration, and integrated testing, followed by 3 months of trial operations and concluding with 2 weeks for final Safety and Security Certification transmittal to DTS.

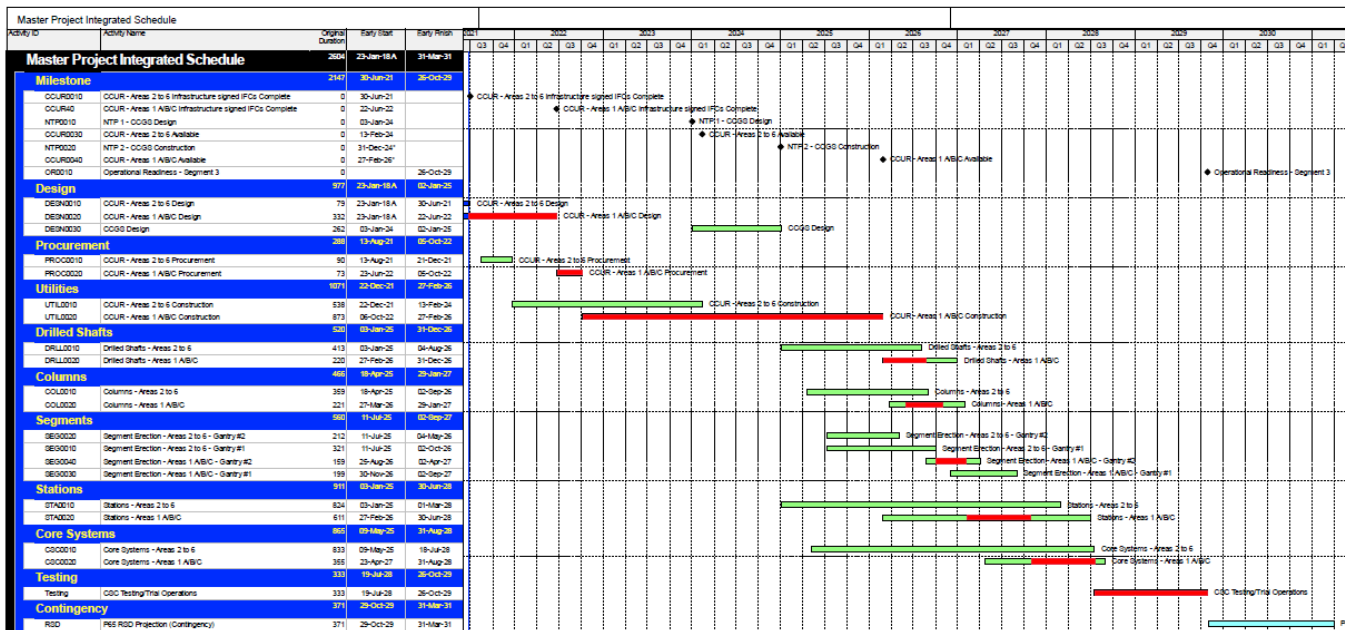
Concurrent parallel critical path to the utility relocation is mobilization of the falsework from Kahauiki Station at Middle Street Transit Center to Ahua Station at Lagoon Drive. The critical path to March 2024 is not currently risk adjusted (not reflecting any float for contingency). Our Assessment Team is recommending that HART consider adding a risk-adjusted contingency to the OR date, based on a P65 risk analysis, similar to the approach on Segment 3.



Sample of Segment 2 Critical Path Activities

Segment 3 (City Center)

Currently 3% complete, the critical path to Operational Readiness begins with the final design of the HECO Aerial Utility Relocation (Undergrounding) throughout Area 1 (Dillingham Area), forecast to complete in June 2022, then HART can complete procurement and award of the CCUR Construction Contract (NTP October 2022). The critical path then flows through the CCUR relocations of Area 1, to the critical construction trades sequence described above in the overall critical path. The major critical path sequence is controlled by packaging the construction trades into separate sequential procurements for Utility Relocations (CCUR), then Guideway and Stations (CCGS), then Core Systems (CCSC), followed by 5 months of integrated testing and trial operations, forecasting an earliest OR for Segment 3 by end of October 2029. A contingency of 17 months has been added per the P65 risk analysis, for a conservative Operational Readiness of March 2031. There is currently underway, a risk mitigating design modification to the Area 1 alignment referred to as the "Mauka Shift" (toward the mountain side of the road), which will reduce the magnitude of the utilities to be relocated in that area. The assessment team is awaiting the results of the HART re-scheduling effort to incorporate the Mauka Shift, to see how it may reduce the critical path to Segment 3 OR date.



Sample of Segment 3 Critical Path Activities (Overall Summary)

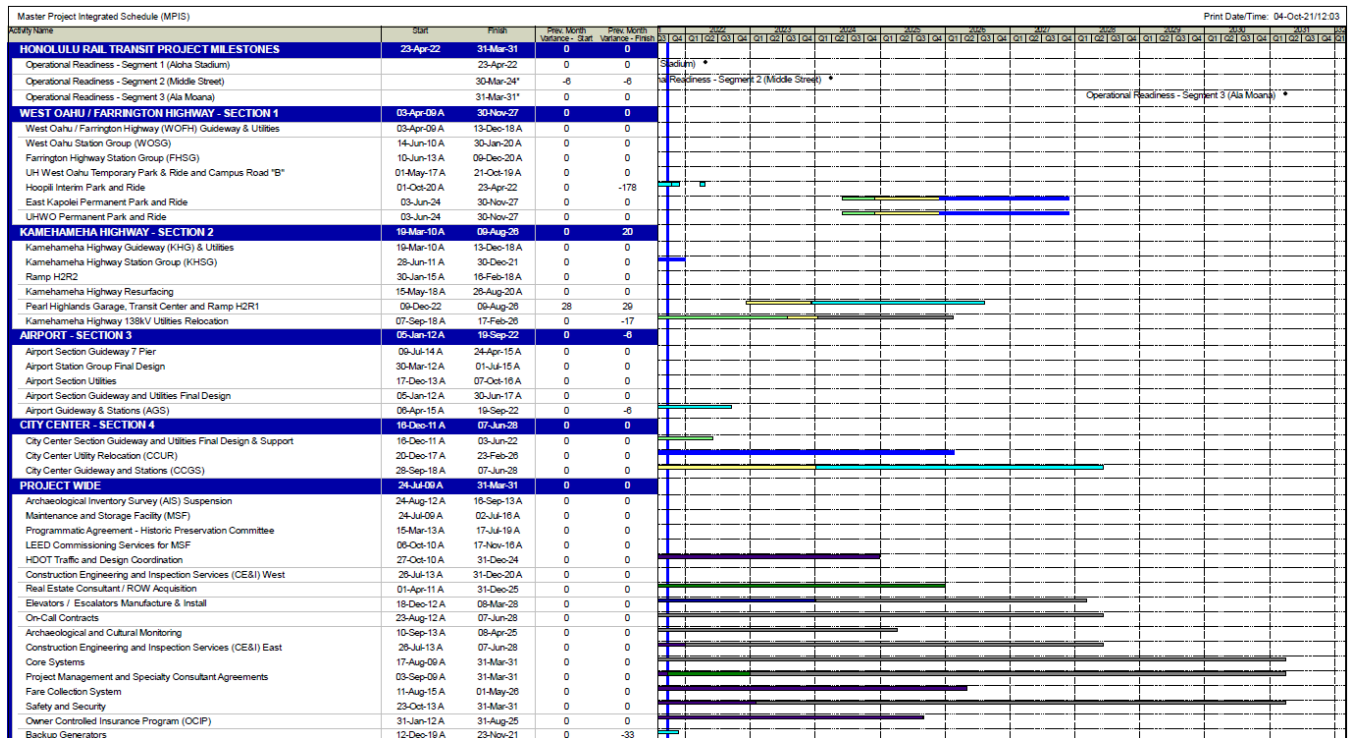
4.0 Structure of Schedule

4.1 Master Schedule Structure

The HART Master Project Integrated Schedule (MPIS) is currently organized first by major LRT Segment, then by Procurement Contract. The procurements have been packaged by the major critical path construction trade elements (i.e., ROW parcels, utility relocations, guideway and stations, core systems, and construction engineering and inspection professional services.) for each Segment separately. Level 3 MPIS is the lowest level of integrated activities representing Control Accounts which are synchronized with the master budget and cost estimate at complete.

When updating the HART PMP, some clarification is needed for distinction between the Master Schedule levels of varying detail and their purposes for planning and controlling the work. The following are our Assessment Team's recommended definitions for Master Schedule levels which aligns with most common and best industry practices:

- Level 1 is the Executive Summary Schedule or highest-level management summary schedule for a Program of projects, or a Project with sub-projects, showing only their overall durations with start and finish milestones. The HART Project Level 1 Schedule might simply show the 3 major LRT Segments, MSF Operations facility, and Vehicles procurement as sub-projects.
- Level 2 is the Planning Schedule for procurement packaging level to plan and control primary delivery contracts and resource deployments in concert with the fundamental planning, development and delivery phases, their sponsor's funding availability, and financial authority decision milestones.



Sample Level 1 and 2 Summary Schedule

- Level 3 is the Control Schedule or Control Account summary level for assigning delivery accountability to specific resources, and typically aligns with FTA's SCC level 2 deliverables and should also directly correlate with a summary of the Contractor's Schedule of Values (SOV) roll-up. Control Accounts are commonly created at the lowest defined levels of the Program/Project's Organizational Breakdown Structure (OBS), Work Breakdown Structure (WBS), and Cost Breakdown Structure (CBS).
- Level 4 Schedules are typically the Contractor's detailed CPM activities, and their sub-contractors' fabrication and 3-week look-ahead schedules are then considered Level 5 (summarized to Level 4 for updating the P6 schedule details).

4.2 Enterprise Project Structure (EPS)

The Enterprise Project Structure is the hierarchical organization view in Primavera P6, for all projects with the enterprise. HART's top-level EPS nodes are organized by Scheduler work areas to simplify controlling security access to the scheduling data. The Master Schedule node is first in the hierarchy, for the purpose of keeping all projects and sub-projects within the MPIS collectively and uniformly maintained, followed by the EPS nodes for Contractor's and HART Schedulers' development work areas for isolating their schedule updates and what-if scenarios that are in process. HART's EPS utilization reflects industry practice.

4.3 WBS

The Work Breakdown Structure (WBS) for the MPIS aligns with major project lifecycle phases and construction work types but is not ideally aligned with the FTA's Standard Cost Categories (SCC).

Even though not required by the FTA PMOC thus far on this project, the Assessment Team recommends aligning the formal MPIS WBS with the FTA SCCs as a means to simplify and streamline the rollup of Contractor's Earned Values for FTA progress reporting and payment applications, as well as assignment of allocated risk-based contingencies from the risk registers. HART is currently accommodating the FTA reporting requirements through the assignment of SCC activity codes in both the P6 Schedules and the Project Risk Register.

5.0 Incorporation of Schedule Risk

All Risks are managed using a centralized Risk Register, developed by HART, organized by FTA's 5 Risk Categories, and assigned to FTA's Level 2 SCCs. Risks which materialize and become contract scope are moved to the Change Log and are retired from the Risk Register. We understand that all remaining risks in the risk register pertain mostly to Segment 3, as Segments 1 and 2 have completed sufficient construction towards mitigation of their specific risks. As Segment 2 has more than 2 years remaining to complete, we'd recommend a risk-adjusted contingency be considered similar to Segment 3.

"Expected Values" of Risks are modeled by applying probabilities and cost/schedule ranges of low, most likely, and high, then using Monte Carlo methods to run multiple simulations/iterations and arrive at a 65% likelihood (P65) outcome to be used in forecasting Total Project EAC and Schedule Completion. The results for Segment 3 are summarized below:

- Construction – 49 risks, 19 on critical path, 27 months total cumulative expected impact
- Design – 8 risks, 3 on critical path, 6 months total cumulative expected impact
- Management Capability and Capacity – 4 risks, 1 on critical path, 0(zero) months total cumulative expected impact
- Market Conditions – 2 risks, 0(zero) on critical path, 0(zero) months total cumulative expected impact
- Requirements – 32 risks, 5 on critical path, 20 months total cumulative expected impact

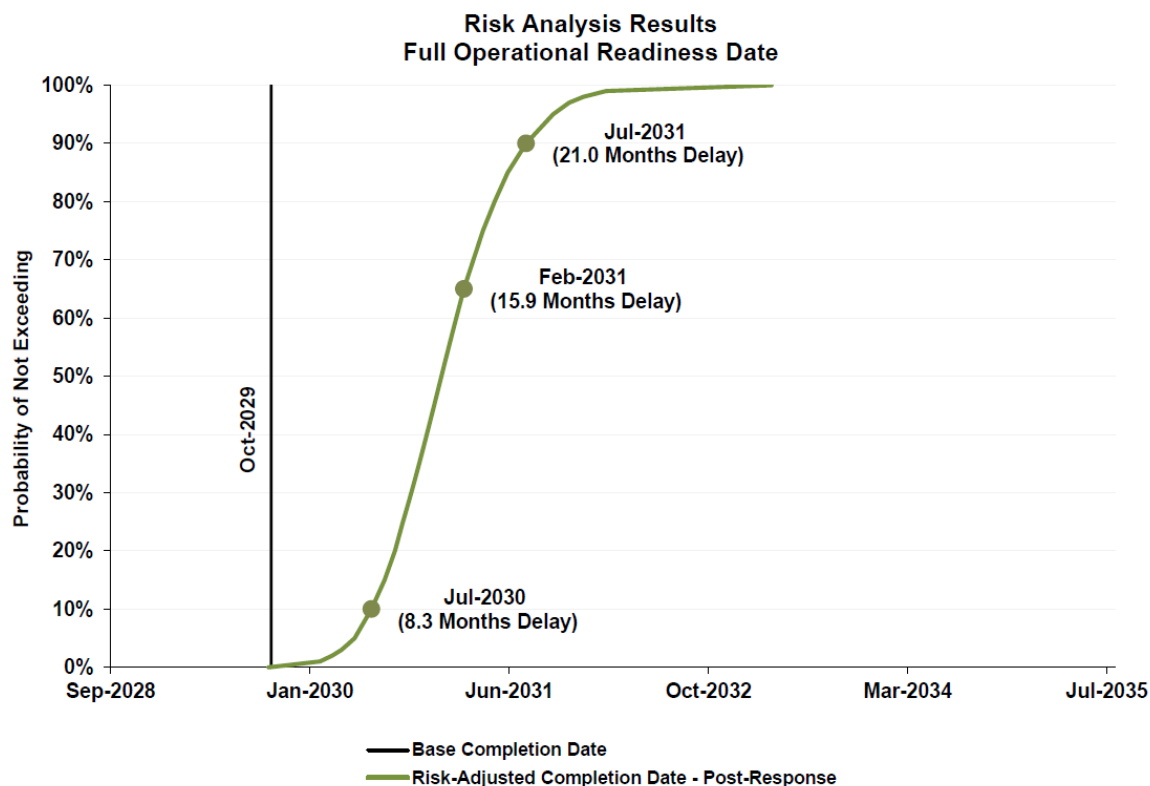
Note that the sum of "total cumulative expected impacts" for these risk categories is much higher than the risk-adjusted contingency 18-month duration added to the end of the critical path for Segment 3. That is because 1) not all expected impacts are assigned to critical path activities, and 2) the total cumulative risk-adjusted contingency duration is calculated by running a Monte Carlo risk analysis on the comprehensive CPM schedule including detailed activities and logic from all contract schedules and incorporating all risks.

- Most common High-Risk areas:
 - a. **ROW** – HART staff assured our Assessment Team they are way out ahead of the construction access needs for property acquisition activities. Most ROW has already been acquired in Segment 3, with the exception of the Ward Avenue and Queen Street properties around the Kukuluao Station, but that one has 1-2 years of float since not in Area 1 (Dillingham).
 - b. **Utilities** – Utilities are complete in Segment 1 (no longer a risk). Final Utility Relocation recently completed in Segment 2. All remaining utility risks are in Segment 3, with the most significant utility relocations in the Area 1 (Dillingham). HART staff have assured the Assessment Team that the utility relocations in the City Center are very thoroughly planned and AECOM has been coordinating with the utility owners for final designs to be completed by summer of 2022. Most conservative relocation durations have been assumed for the Segment 3 (CCUR) schedules.
 - c. **Third Party Approvals** – Even though Industry expert organizations such as The Eno Center for Transportation (Eno, <https://projectdelivery.enotrans.org/>) recommend Third Party Approvals as one of the highest risk areas to transit projects, HART project staff have assured our Assessment Team that they have been very proactive in public engagement activities in an effort to mitigate this risk, and have established positive working relationships with all Third Parties involved with the project, especially around the station area vicinities such as the University of Hawaii school campus buildings. Many of the station area stakeholders are anticipating to have the transit project completed and are committed to meeting review cycle timeframes spelled out in their agreements.

The remaining schedules appear to have adequate duration contingencies included to cover these high-risk areas, however they must be continuously monitored and managed to assure on-time completion.

6.0 Schedule Contingency

Overall Schedule Contingency is based on the Monte Carlo risk analysis outputs. Below is an excerpt from the Monte Carlo report. The Assessment Team noted that the analysis calculates a 65% probability (P65) of 16 months delay and a February 2031 OR date, but HART chose to include a 17-month contingency activity and March 2031 OR date in their risk-adjusted schedule forecast for Segment 3.



Sample provided by HART

7.0 Schedule Specification

The Assessment Team reviewed the most current Schedule Specifications included with the AGS contract. In general, the schedule specification meets with industry best practices. We've suggested the following improvements and questions for consideration:

- Section 7.6.1.a.5: Clarify that any milestones added to the schedule are not considered contractual milestones if not explicitly identified in the contract as a schedule requirement.
- Section 7.6.1.a.6: Does HART enforce the clause about withholding progress payments if schedules are not maintained per the spec? If not, why put in the spec and consider eliminating.
- Section 7.6.1.a.8: It is good to have the scheduler position qualifications listed. It would also be good to make sure this position is called out as a 'key' person in the request for proposals/bids.
- Section 7.6.1.a.9: Consider using "accepted" instead of "approved" in this section and all schedule spec language.
- Section 7.6.1.b: Is it achievable for a contractor to provide a compliant 'cost-loaded' Baseline Schedule 30 days after NTP? Consider modifying this to submit a 'Preliminary Baseline Schedule' within 30 calendar days to cover scope of the first 90 days. Then submit a full cost loaded schedule within 90 calendar days.
- Section 7.6.1.b: We are assuming the HART review times on submittals are defined elsewhere.
- Section 7.6.1.b.4: Consider adding the following clarification for lags – "Negative lags are prohibited. Lags should be kept to a minimum and should be substituted with activities. No lag within the schedule shall have a duration exceeding 20 working days or exceeding the duration of the successor activity."
- Section 7.6.1.b.7.F&G: Should clarify whether these are required codes or just milestones.
- Section 7.6.1.b.8.B: Assuming "As-Builts" activities would be cost-loaded. So that money is being withheld to do this task.
- Section 7.6.1.b.8.D: If a full Contract Data Requirements List (CDRL) is prepared for the project, that would be a good start for a milestone checklist for the baseline schedule.
- Section 7.6.1.b.8.L: The 25% limit of critical activities should be carried over to the monthly updated schedules. And when verified, if it isn't met in an updated schedule, the specification should also allow for HART to ask for a recovery schedule of some sorts. The schedule specification should also define what is a 'critical activity', such as "any activity with total float less than 20 days".
- Section 7.6.1.c: Suggest that HART have any major sub (5% of work or more, or if their work falls on the critical path) signs off on the submittal along with the prime on the baseline schedule and any monthly updates. This will give HART an indication if there are any problems between the subs and the prime.
- Section 7.6.1.d.3.B: What if the contractor is not working to these Time Periods. HART want them to use what they are assuming for days per week, hours per day and such. Their baseline narrative should have the same assumptions listed.
- Section 7.6.1.f.2: Consider using a tool like Acumen Fuse to show monthly deltas in the schedule. HART can require this of the contractor as well to use and submit reports. Ultimately is a good tool for them as well.
- Section 7.6.3: Identify what schedule is to be used for the TIA. "The date of the most recent Schedule update shall be a date prior to the date the change is given to the Contractor, the date the delay occurred or the date the Contractor submits a request for a Change. The event times used in the Time impact Analysis shall include the most recent Schedule update or as adjusted by mutual agreement".
- Section 7.6.6: Something to consider adding to this section- "The progress schedules will reasonably correlate with any 'field schedules' utilized by the contractor. Any 'field schedules' will be made available to HART at their request".

7.1 Additional Considerations:

- Consider requiring the schedule to include major quantities loaded as resources on activities (i.e., number of OCS foundations/poles, numbers of piers/girders, etc.). Graphs could then be developed to show planned installed quantities and how actuals are progressing. Valuable visual tool to see progress and if achieved installation rates are being met, and if the estimate to complete is realistic.
- Consider having the contractor work in HART's schedule database. This could alleviate any issues with importing XER's into HART's schedule database.
- When discussing cost-loading it would be helpful to restrict cost-loading of any level of effort activities. It has the potential to distort the S curves and earned value should be held at the lowest level for accuracy.

- Is there a “due date” for submitting the progress schedules? There is a specified data date (“status as of” date) of the last Friday of each month, but there is not a specified time period for how many days after that they have to get the schedule updated and submitted.
- There should be a definition of HART’s review process/duration/approval, etc. Will there be a draft, review and final for payment? Or is it just the one submittal?
- A clause that has been helpful in the past to look at the effects of a progressed only schedule (without any logic manipulation, duration changes, etc.) is “As requested by HART, the Contractor will prepare for review a Progress Only Schedule. This Schedule will accurately reflect progress through the previous month but will not modify logic or durations for activities not in progress. Therefore, showing only progress to date, identifying any potential impacts to the Schedule milestone completion dates prior to any Schedule mitigation efforts”.
- Consider adding this clause so review activities do not just get extended durations: “Any time there is a need for a resubmittal and additional review for any documents, whether to a Third Party or the HART representative, additional activities will be added to the Schedule to identify these additional submittals and reviews.”
- Costs should be loaded on an activity with a resource not an ‘Expense’, consider adding: “Expenses will not be used by the Contractor in lieu of a Resource. Any billable expense item cost should be built into a Resource rate or set up as a separate non-labor or material resource”.
- Consider adding definitions for seasonal weather conditions. Example: “Days shall be based on the average historical seasonal weather or climatic conditions for the preceding 10 years in the area as prepared by the National Oceanographic and Atmospheric Administration (NOAA). The Contractor shall submit the days for Approval by the HART representative....”. And then keep track in the monthly report.

8.0 Contractor/Consultant Schedules (Baseline and Progress Updates)

- **Management of Baselines and Updates:** Schedules are reviewed by the Construction Engineering and Inspection (CE&I) teams and progress (start/finish dates and physical % complete) is verified by HART's field scheduling team. The contractors' P6 data is then used to update and integrate detailed and summary activity status within the MPIS.
- **Quality and accuracy of the Contractor/Consultant schedules:**
 - Shimmick, Traylor and Granite (STG's) Airport Guideway and Stations (AGS) schedule: Original baseline and updates are generally of good quality, realistic and accurate, however has been re-baselined twice. Updates, however, the need for the re-baselines were based on unplanned delays/impacts.
 - Hitachi Rail Honolulu (HRH's) Core Systems Contractor (CSC's) Segment 1 schedule: original baseline and progress updates were not planned in sufficient detail to assess actual production rates and durations for comparison with Segment 2 and 3 schedules. The remaining Segment 1 work is being coordinated in the field with only testing/commissioning activities left to track and complete.
 - HRH's CSC Segment 2 schedule: timing and sequence of activities are dependent on contractually negotiated AGS access/handoff dates. MSF Operations facility testing schedule could use better integration with the running line comms/systems install and test durations.
 - HRH's CSC Segment 3 schedule: is more detailed than previous segments. Logical sequencing of activities is valid, but durations for testing and integration activities are still lengthy and not based on any evident resource or unit production rates.
- **General:**
 - Workday and shift calendars are incorporated into the schedules. Based on a 5-day workweek requirement, and special calendars are used for holidays work around the airport.
 - HART has integrated the AGS and CSC detailed contractors' schedules into one combined P6 schedule within the MPIS to track critical path progress performance to completion.
 - HART continues to encourage and enforce the use of the primary baseline and progress reporting schedules in P6 as the contractors' planning tool for remaining work.
 - STG (AGS) is cooperating with using only one schedule for internal planning and external reporting.
 - HRH (CSC) is now also using 1 P6 schedule for internal use and reporting to HART.

9.0 Pending Delay Claims

Major pending delay claims: (will be confirmed against the Cost Estimate Evaluation)

- The Contract Access Milestone (CAM) dates from the AGS contractor (STG) is being incorporated into the updated CSC schedule for Segment 2. This may result in a delay claim from the Core System Contractor (HRH). Now that the commercial team has settled the original delay (219 calendar days) with STG, HART is continuing to work with them to mitigate and recover the critical path impacts, to reduce the durations of the 2 related potential further delay claims: one for an additional 111 calendar days, plus another for 163 additional calendar days, totaling 274 additional calendar days currently under Time Impact Analysis (TIA) review.
- General:
 - Lessons learned and delay claims avoidance strategies are being incorporated in schedules and specs. Example: updating the cost/resource loading specifications for remaining Segment 3 contracts, after TIA experience/lesson learned on Segment 2 - AGS.
 - Incorporating lessons learned from Segment 1 safety, quality non-conformance, and testing delays (i.e., does contractor need more contingency for safety and quality certification processes?)
 - Settled claims are reflected in the actual completed and past activities.
 - HART has also incorporated claims avoidance techniques into their schedule management process. Example: Baseline and Updated schedule reviews focus priority on assessing potential claims and mitigating the impacts.
 - HART has developed a change control committee (CCC) and time impact analysis (TIA) processes. The CCC meets weekly as needed. TIAs are requested from the contractors for each major contract change, and then evaluated as part of the Change Order negotiation process.

10.0 Staffing Evaluation

HART staffing is not currently based on resource-loaded agency review activities in the Master Schedule. Planning for Consultant/Contractor staff is based on Level-of-Effort (LOE) activities as % of design or construction. The following table compares current staffing vs peak staffing for Scheduling support staff:

	HART Project Controls	CE&I West	CE&I East	TOTAL
Previous Staff				
Lead Scheduler	1			1
Senior Scheduler	5.5	2	2	9.5
Scheduler	1	1		2
	7.5	3	2	12.5
Current Staff (2021)				
Lead Scheduler	1			1
Senior Scheduler	2		1	3
Scheduler	1		0.5	1.5
Jr. Scheduler	1			1
	5		1.5	6.5

Table 10.0 Max Scheduling Staff (2017-2018)

The current level of Scheduling support staff is adequate to complete the program. Of the 2 HART Sr Schedulers remaining, 1 is dedicated to primarily focus on Core Systems planning, which is based on lessons learned from Segments 1 & 2.

11.0 Production Rates

11.1 Hours and Major Unit Quantities

- The general assessment is that the production rates assumed for the remaining major construction activities are adequate, based on combination of HART's expert field observations, actual past performance by current and past contractors on the work completed thus far and on proposed schedules from the PLOs (PPP Developers).
- Critical path construction activity production rates (units per time period) by Type of Work:
 - Foundations (drilled shafts): CCGS is assuming 4 crews (7-8 days / drilled shaft/ crew) based on maximum production of 5-6 crews (7.5 days / drilled shaft / crew) in KHG, WOFH and AGS, and in the P3 proposal schedules.
 - Columns (each): CCGS is assuming 4 crews (6 days / column / crew) based on 6-8 crews with an average production of 6.5 days/column/crew in KHG, WOFH and AGS.
 - Precast Girders (spans):
 - Segment 1 (Kiewit) – maximum production rate of 2-3 days / span / gantry (using 3 gantries for 7.5 spans per week total)
 - Segment 2 (STG) – maximum production rate of 3 days / span (using 3 gantries, averaging 9 days / span / gantry including delays).
 - Segment 3 (planned forecast) – average 5 days/span/gantry (currently assuming 2 gantries). Production rate is more conservative than Segment 1 and 2 which seems warranted because of more restricted access for crews, cranes and material staging in the denser urban area of the City Center.
 - Stations (platforms): CCGS platform erection is based on the AGS baseline schedule and actual performance to date, assuming 2 sets/crews of station falsework.
 - Core Systems SITs (systems components installation and testing): No production rate data was provided or discovered for Core Systems installation and testing activities, however the durations for these activities in the MPIS have been based on Hitachi's and Lea & Elliot's past experiences in the field.

12.0 Logic/Sequence

The logic and sequence of work activities determines the overall duration of the project and can vary based on “means and methods” of the contractor or consultant performing the work. The logic and sequence of activities also affects the efficient and effective use of resources and the resulting overall cost performance for the project.

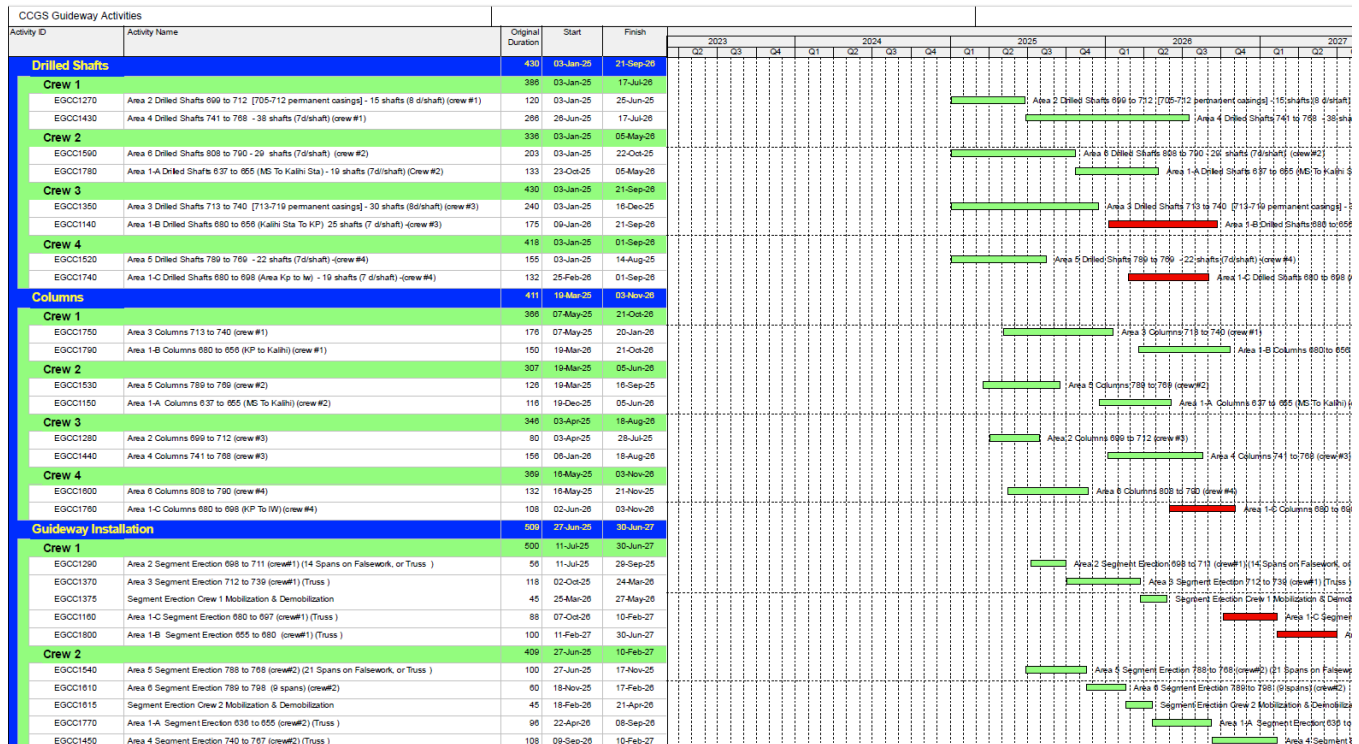
While adding more crews of the same trade allows for concurrent work of the same construction trade in multiple areas of the project, the critical sequence of all construction trades follows a typical path of 1) ROW Acquisitions/Access/Permitting; 2) Utility Relocations; 3) Sitework Preparations; 4) Foundations (Drilled Shafts); 5) Columns; 6) Guideway Structure (Precast Segmental Girders); 7a) Stations (Platforms); 7b) Track; 8) Systems; 9) Integration and Operational Readiness Testing. Trackwork and Stations work can be built concurrently in the same locations; however, Stations are typically on the longest (critical) path to completion, because the majority of the platform finishes, and equipment installations require unencumbered site access after all guideway work is completed.

A sample of the basic trade flow sequencing and critical path logic is shown in the summary of Segment 3 critical path activities (see *Section 3.0 Critical Path*).

13.0 Resource/Cost Loading

There are currently no requirements in existing contracts for loading major resource quantities on activities. However, while most schedules contained in the MPIS are not resource-loaded, the major critical path items in the schedules are resource-driven using preferential logic, and quantity loaded with major production units. (For ex: CCUR current schedule is quantity loaded for linear feet, sq ft, etc.)

Also, CCGS is sequenced specifically with crew availability in mind for construction, similar to AGS. This was verified when comparing to the bid schedules submitted by the P3 bidders in July 2020. A sample of the CCGS scheduled crew logic is shown below (highlighting the crews working in Area 1 as being on the critical path).



And the assessment team was assured that for future procurements, the contract language will require more detailed resource loading and moving away from Expenses.

The requirements for loading contract Schedule of Values (SOV) costs in the contractor's schedules are not in the P6 Schedule specifications, however, these cost-loading requirements are found in current contracts' Terms & Conditions for the purpose of measuring earned value progress payments on all activities performed to date. The contractors load costs on P6 activities using expense items. Contractor SOV total costs in their pay requests must match their schedule total costs by line item. If there is a discrepancy, it is flagged as a possible cause for rejection of the schedule or pay request, or both. This applies to BPS (Baseline Project Schedule) and progress schedules. The BCWS (Planned Values) and BCWP (Earned Values) are based on the SOV.

HART utilizes cost-loaded summary schedules for cashflow modeling of 'what-if' scenarios which is commensurate with industry best practices; however, we would also recommend resource-loading with labor hours and major material quantities which helps determine unit costs and productivities required to forecast accurate completion dates and costs at complete.

14.0 Tracking

14.1 Earned Value Analysis

Contractors report physical percentage (%) complete on all activities and multiply by their budget to calculate Budgeted Cost of Work Performed or Earned Value (BCWP or EV). Schedule of Values (SOV) cost-loading is assigned as expense items (SCC items) not on Resources in P6.

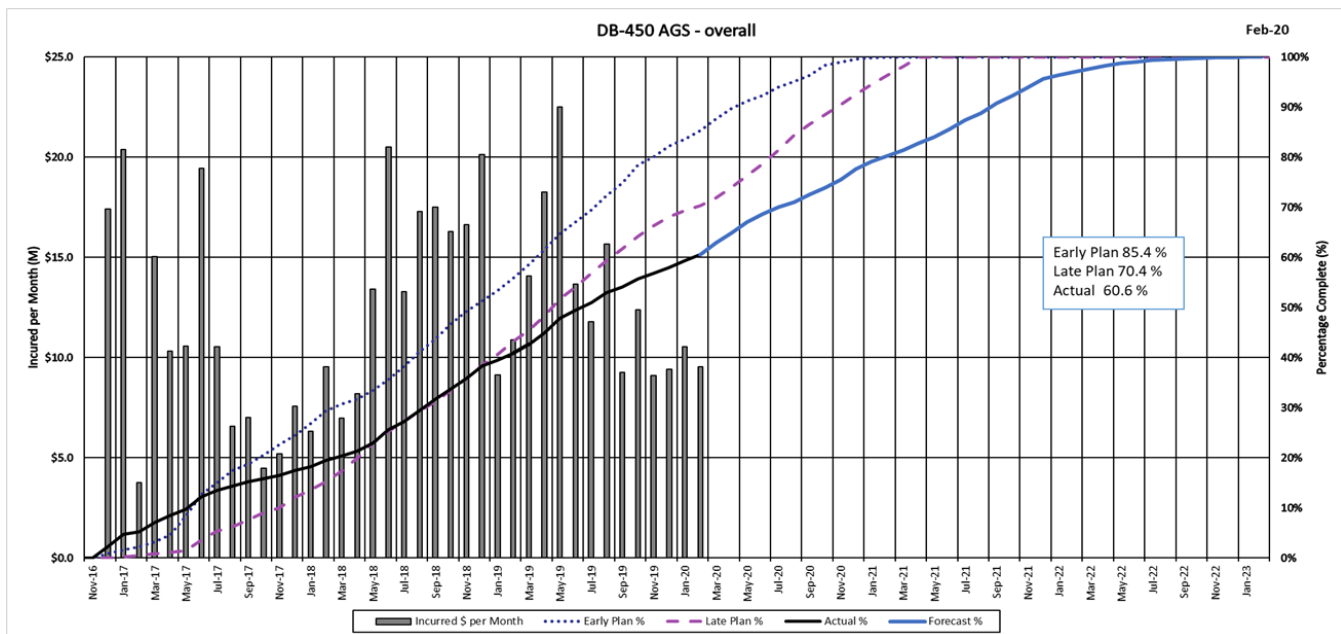
14.2 Progress Reporting

Progress reporting and payment for the work in the field is based on EV performance. Actual start and finish dates are updated monthly and verified with HART's schedulers in the field. This is in line with best industry practice.

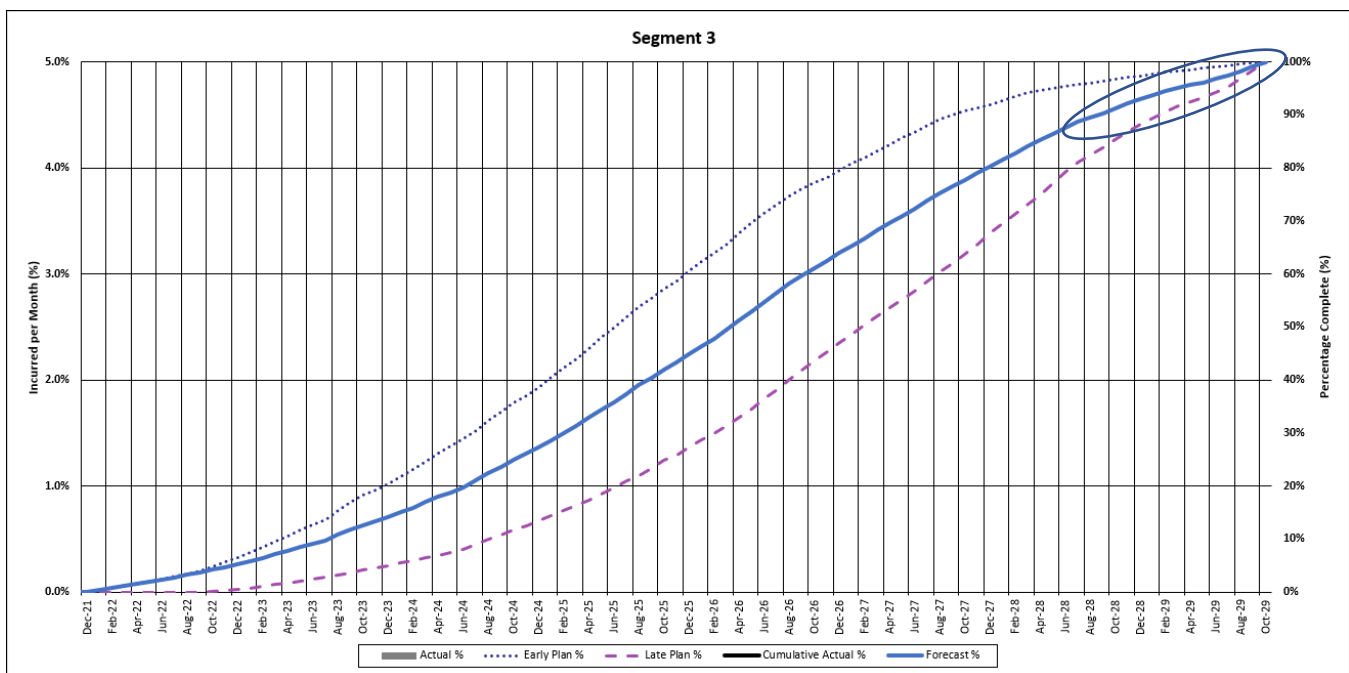
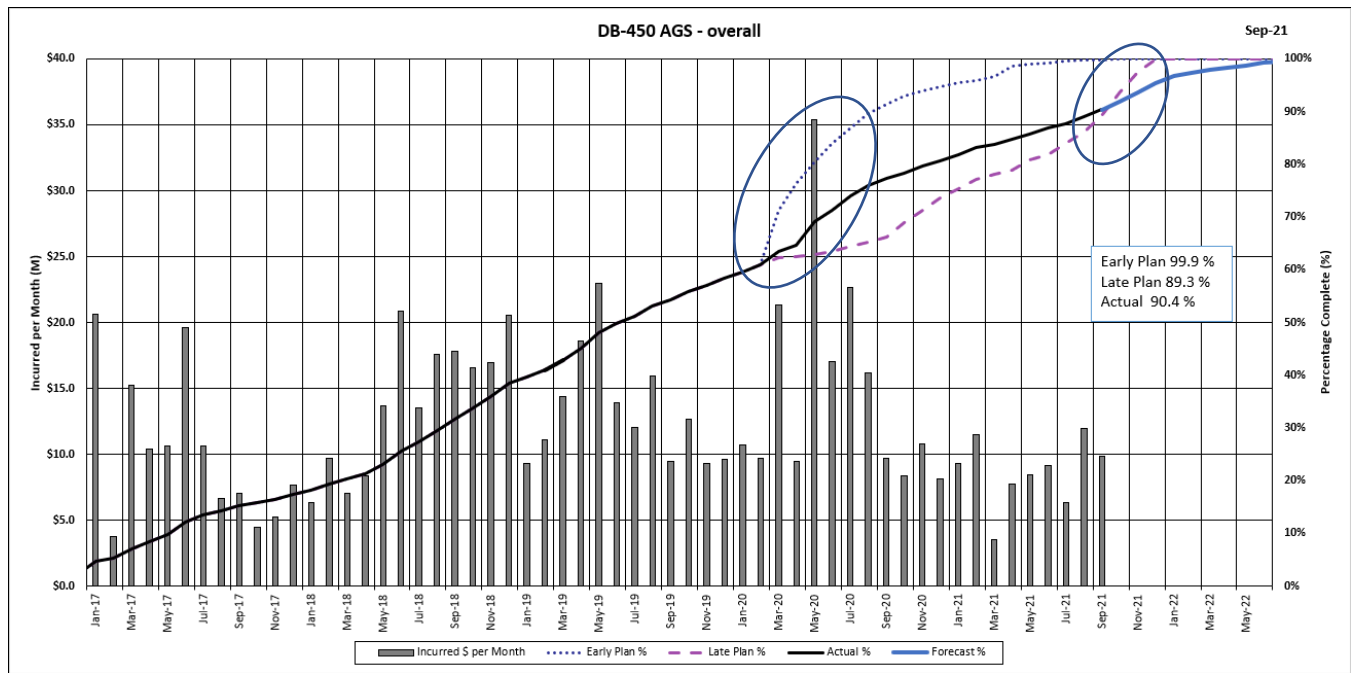
14.3 S-Curves

Shows Early and Late planned curves compared with Actual and Forecast curves. HART does not have data to produce S-curves from the Segment 1 Utilities, Guideway or Stations Contracts or the Core Systems Contracts for Segment 1 or 2. However, they have AGS curves, and all CC contracts are planned to be resource and cost-loaded to provide S-curves for EV analysis. See the following page for more information.

The overall S-Curve graphic below is for the Airport Segment Guideway and Stations contract and shows the actual progress as of February 2020 (just prior to COVID) and the forecast to complete curve in blue. This is a good depiction of how the production and performance of the AGS contractor never achieved the steepness of the baseline early and late curve envelope, meaning the original baseline was overly-optimistic as to planned production rates. This lesson learned is being carried into the planned schedule performance for the City Center Segment, which forecast production similar to the actual curve here.



Comparing the February 2020 version to the below September 2021 overall S-Curve (indicating a re-baseline in March of 2020), it is apparent that actual progress performance accelerated for a few months then resumed back to the previous average rate of production and schedule performance through the remainder of 2020 and 2021 (during COVID). This is evidence that the maximum achievable production shown in the original and revised baselines (see areas in ovals) was unrealistic. The Actual and Forecast curves reflect reality of the current possible production rates based on local resource, environmental and economical constraints.



When comparing the overall Forecast S-curve for Segment 3 City Center above (including Utility Relocations, Guideway, Stations and Core Systems) with the Segment 2 Actual/Forecast curves, the planned production appears to be very realistic and achievable given the same local resource, environmental and economical constraints.

The Assessment Team recommends looking at the final 8-12 months of Systems Testing and Integration to see if more production (crews) should be planned to stay closer to the Early Plan curve. Essentially making the current Forecast curve (see area in oval) become the Late Plan curve. This can be achieved by scheduling more detailed and discrete finish-start activities, based on assumed logical resource trade-flows, either through concurrent or parallel crew sequencing (linear scheduling technique), or resource loading and leveling analysis of the unconstrained P6 activities.



PART THREE

MAUKA SHIFT ASSESSMENT REPORT

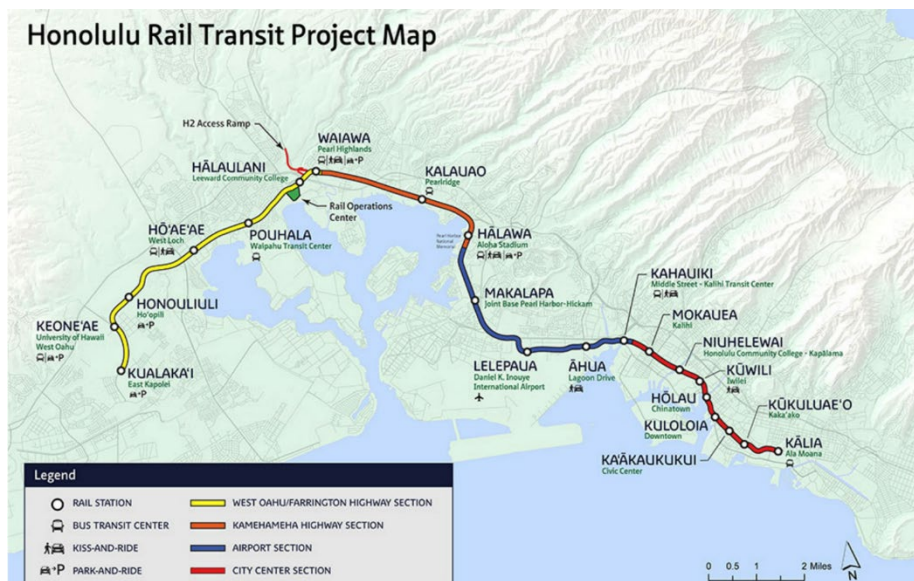
Report Issue Date: December 3, 2021

INTRODUCTION

The Assessment Team provided a cost assessment of the impact of the Mauka shift which eliminated a substantial amount of utilities that needed to be relocated in critical areas of Area 1C (Dillingham). Shifting the guideway to the Mauka side of the roadway allows the project to leave all Makai utilities in Area 1C overhead, in-place. The majority of the cost savings were found by elimination of work, easier construction methods, and a reduction of the overall project schedule. Since design is preliminary at this stage, the Assessment Team relied heavily on unit pricing already reviewed in the previous overall HART program evaluation for the cost assessment portion of this report. This cost assessment is broken into three sections:

1. Utility Relocations
2. Guideway Savings
3. Professional Services (soft costs)

Each group is detailed in the sections to follow.



The Assessment Team also noted the Segment 3 scheduled completion data now reflects the recent approval of the Mauka Shift design changes in the Dillingham Area, resulting in a 5-month earlier risk-adjusted Operational Readiness Date. This will be expanded on in greater detail in Section 6.0 of this report.

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1.0 Overview

The current rough order of magnitude (ROM) estimate provided by the HART Project Team for the impact of the Mauka Shift accounts for a total estimated savings (or credit) of \$145M. The Assessment Team split this evaluation into three parts: 1) Utility Relocations, 2) Guideway, and 3) Professional Services as indicated in Table 1.0 below. Globally, the Assessment Team agrees with the potential cost savings opportunity presented by the Mauka Shift. The methodologies used by the HART Project Team appear well thought out and appropriate for the available information regarding the Mauka shift. The largest discrepancy found during this evaluation pertains to allocated contingency (AC) amounts being absent from the current potential savings forecast. Since base cost plus AC is currently being held in HART's Estimate at Completion (EAC), it is the position of the Assessment Team that these should also be included in potential savings (credited) work.

Description	HART's Current ROM			Assessment Team's Recommendation			Delta
	Base	Contingency	Total	Base	Contingency	Total	
Utility Relocations	(\$50.3M)	-	(\$50.3M)	(\$50.3M)	(\$14.1M)	(\$64.4M)	(\$14.1M)
Guideway	(\$20.6M)	-	(\$20.6M)	(\$20.6M)	(\$3.1M)	(\$23.7M)	(\$3.1M)
Professional Services	(\$74.1M)	-	(\$74.1M)	(\$74.1M)	-	(\$74.1M)	-
Total	(\$145.0M)	-	(\$145.0M)	(\$145.0M)	(\$20.9M)	(\$165.9M)	(\$17.2M)

Table 1.0

It should also be noted that Segment 3 schedule data now reflects the recent approval of the Mauka Shift design changes in the Dillingham Area, resulting in a 5-month earlier risk-adjusted Operational Readiness Date (from March 2031 to October 2030).

2.0 Utility Relocations

2.1 Utility Relocation Savings

- a. **Overview:** The Assessment Team evaluated a ROM estimate for the credit for the relocation of utilities for moving the guideway to the Mauka side of Dillingham Boulevard. The utilities involved include drainage, sewer, water, electrical, and gas. Other associated work includes roadway work, selective demolition, dewatering, jet grouting, erosion control, clear and grub, fencing, concrete flatwork, traffic control, pavement markings, and signage.

Description	HART's Current ROM			Assessment Team's Recommendation			Delta
	Base	Contingency	Total	Base	Contingency	Total	
Project General	(\$20.4M)	-	(\$20.4M)	(\$20.4M)	(\$5.7M)	(\$26.1M)	(\$5.7M)
Civil Underground	(\$47.5M)	-	(\$47.5M)	(\$47.5M)	(\$13.3M)	(\$60.8M)	(\$13.3M)
Electrical	(\$1.1M)	-	(\$1.1M)	(\$1.1M)	(\$0.3M)	(\$1.4M)	(\$0.3M)
Surface	(\$2.9M)	-	(\$2.9M)	(\$2.9M)	(\$0.8M)	(\$3.7M)	(\$0.8M)
Contingency for Unknown Impacts	\$21.6M	-	\$21.6M	\$21.6M	\$6.0M	\$27.6M	\$6.0M
Total	(\$50.3M)	-	(\$50.3M)	(\$50.3M)	(\$14.1M)	(\$64.4M)	(\$14.1M)

Table 2.1

- b. **Findings:** Currently, HART's ROM reflects \$50.3M of savings for the associated work. The Assessment Team found this to be appropriate for this level of detail about the effects of the shift but do believe a host of unknowns exist that could skew these findings. The largest two buckets of cost are Project General and Civil Underground. Project General includes items such as mobilization, traffic control, and allowances. This bucket appears to be appropriate and in line with previous estimates. Civil Underground includes the majority of the construction cost. The unit cost for the credit, particularly the electrical relocation savings, although slightly conservative compared to the original estimate still falls in line with expectations.

The contingency for unknown impacts is the largest area of uncertainty. Without more information on the impacts of the new alignment it is difficult to evaluate the true cost implications. Areas the Assessment Team are particularly concerned about are:

- New impacts to utilities on new alignment
- Mitigation efforts in areas such as environmental and acoustical
- Pedestrian access constraints
- Any other unknown constructability constraints

The HART Project Team has allotted \$21.6M to account for these uncertainties. Based on the limited information, it's the opinion of the Assessment Team that this is appropriate for this level of detail.

As mentioned in Section 1.0, the largest discrepancy found during this evaluation pertains to allocated contingency amounts being absent from this ROM estimate. The Assessment Team recommends applying the same Allocated Contingency percentage used in HART's EAC in the amount of (\$14.1M) or 28% of base cost.

3.0 Guideway

3.1 Guideway Savings

- a. **Overview:** The Assessment Team evaluated the effect of the Mauka Shift on guideway costs. The shift eliminates 8 straddle bents along with their associated drilled shafts, in exchange for more center piers throughout alignment, particularly at Piers 671-699. The estimated savings from the HART Project Team can be found in the table below.

Description	HART's Current ROM			Assessment Team's Recommendation			Delta
	Base	Contingency	Total	Base	Contingency	Total	
Centerline Column Bent	\$1.6M	-	\$1.6M	\$1.6M	\$0.2M	\$1.8M	\$0.2M
Straddle Bent	(\$12.2M)	-	(\$12.2M)	(\$12.2M)	(\$1.8M)	(\$14.0M)	(\$1.8M)
Hammer Head Bent	\$4.6M	-	\$4.6M	\$4.6M	\$0.7M	\$5.3M	\$0.7M
Drilled Shaft Foundation	(\$8.9M)	-	(\$8.9M)	(\$8.9M)	(\$1.3M)	(\$10.2M)	(\$1.3M)
Indirects, Bond, Insurance, GET	(\$5.8M)		(\$5.8M)	(\$5.8M)	(\$0.9M)	(\$6.7M)	(\$0.9M)
Total	(\$20.7M)	-	(\$20.7M)	(\$20.7M)	(\$3.1M)	(\$23.8M)	(\$3.1M)

Table 3.1

- b. **Findings:** Currently, HART's ROM is forecasting a savings of \$20.7M for guideway costs. The Assessment Team reviewed the Bid Items provided by the Project Team and found that they were appropriate for this level of detail. Indirects, bond & insurance, and GET were also evaluated and appear consistent with expectations and industry standards. The Assessment Team recommends applying the same Allocated Contingency used in HART's EAC in the amount of (\$3.1M) or 15% of base cost.

4.0 Professional Services

4.1 Professional Services Savings

- a. **Overview:** The Assessment Team evaluated the impacts of professional services related costs for shortening the schedule by 5 months due to the Mauka Shift. The HART Project Team performed their cost savings exercise based on the new methodology recommended in the Part One Cost Estimate Assessment Report.

Description	HART's Current ROM			Assessment Team's Recommendation			Delta
	Base	Contingency	Total	Base	Contingency	Total	
Eastside CE& I Services II	(\$10.9M)	-	(\$10.9M)	(\$10.9M)	-	(\$10.9M)	-
Program Management Support Consultant III	(\$6.9M)	-	(\$6.9M)	(\$6.9M)	-	(\$6.9M)	-
General Engineering Consultant, Construction (GEC-3)	(\$14.5M)	-	(\$14.5M)	(\$14.5M)	-	(\$14.5M)	-
Core Systems Contract Oversight Consultant	(\$8.8M)	-	(\$8.8M)	(\$8.8M)	-	(\$8.8M)	-
Honolulu Staffing, Expenses, & ODC's	(\$24.2M)	-	(\$24.2M)	(\$24.2M)	-	(\$24.2M)	-
All Other Professional Services	(\$8.8M)	-	(\$8.8M)	(\$8.8M)	-	(\$8.8M)	-
Total	(\$74.1M)	-	(\$74.1M)	(\$74.1M)	-	(\$74.1M)	-

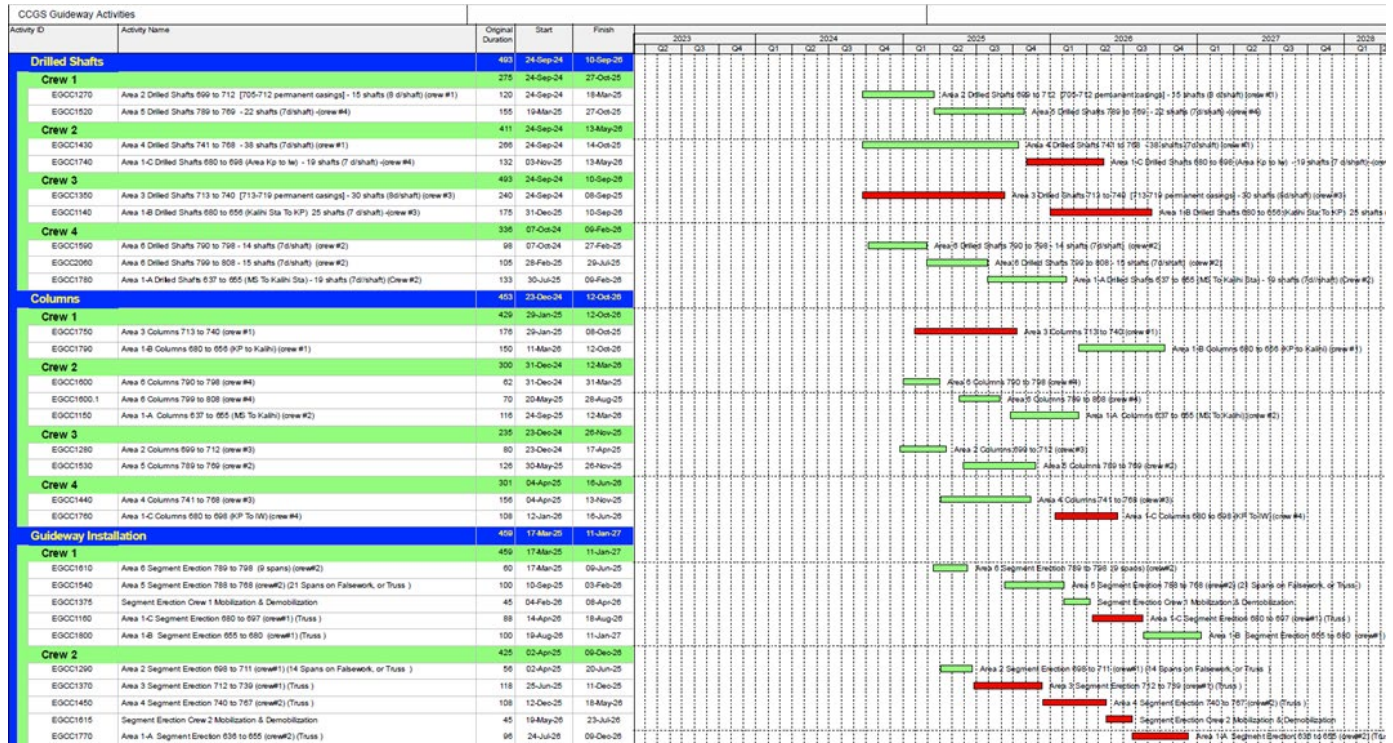
Table 4.1

- b. **Findings:** Currently, HART's ROM is forecasting a savings of \$74.1M for guideway costs. The Assessment Team reviewed the calculations provided by the Project Team and found that they were appropriate for this level of detail. Since HART's cost savings exercise for the Mauka Shift used the same methodology recommended in the Part One Cost Estimate Assessment Report, the savings appears appropriate and no further revisions are suggested at this time.

5.0 Schedule Assessment

The Assessment Team evaluated the effect of the Mauka Shift on the critical path schedule to Segment 3 Operational Readiness. The shift essentially allows the CCUR procurement and construction to begin on the utility relocations in the Dillingham area 2.5 months sooner and shortens the overall duration of CCUR construction an additional 2.5 months for a total time savings of 5 months.

The logic flow of the Segment 3 critical path activities is unchanged by the Mauka Shift; however, the reduced duration of Area 1 construction has brought crew production in other areas onto a parallel critical path. Reduced float in the other Segment 3 areas may increase risk of impacts to timely critical resource allocation and availability. See the revised CCGS scheduled crew-logic graphic below which incorporates the Mauka Shift adjustments to the critical path schedule.



6.0 Conclusion

6.1 Cost Assessment

The Assessment Team performed a high level, top-down assessment on the impact of the Mauka Shift. The largest discrepancy found during this evaluation pertains to allocated contingency amounts being absent from the current potential savings forecast. Since base cost plus allocated contingency is currently being held in HART's EAC, it is the position of the Assessment Team that these should also be included in potential savings (credited) work. Another area of concern that cannot be precisely assessed is the contingency for unknown impacts in the 2.0 Utility Relocation section of this report. Without more information on the impacts of the new alignment it is difficult to evaluate the true cost implications. However, the HART Project Team has allotted \$21.6M to account for these uncertainties. Based on the limited information, it's the opinion of the Assessment Team that this is appropriate for this level of detail.

6.2 Schedule Assessment

The Assessment Team evaluated the effect of the Mauka Shift on the critical path schedule to Segment 3 Operational Readiness. The shift essentially allows the CCUR procurement and construction to begin on the utility relocations in the Dillingham area 2.5 months sooner and shortens the overall duration of CCUR construction an additional 2.5 months for a total time savings of 5 months. The assessment team concurs with the incorporated Mauka Shift adjustments to the Segment 3 schedule, which now reflects a forecast (early) Operational Readiness date of May 2029 (Risk-adjusted Operational Readiness date is now October 2030).

Appendix D

PMOC Management Capacity and Capability Review

MANAGEMENT CAPACITY AND CAPABILITY REVIEW

Update

Honolulu Rail Transit Project

City and County of Honolulu
Honolulu Authority for Rapid Transportation (HART)
Honolulu, Hawaii

December 2, 2021

PMOC Contract Number: 639519D000017

Task Order Number: 6931952F300006

OPs Referenced: 01, 25

Hill International, Inc.

One Commerce Square, 2005 Market Street, 17th Floor, Philadelphia, PA 19103

PMOC Lead: Program Mgr. Michael E. Radbill, PE (267) 251-8341, michaelradbill@hillintl.com

Task Order Manager – Danny Rogers, PE, (919)214-1921, dannyrogers@hillintl.com

Length of Time PMOC Firm Assigned to Project: 43 months

Length of Time PMOC Leads Assigned to Project: 43 months

EXECUTIVE SUMMARY

On May 30, 2019 the Federal Transit Administration (FTA), Region IX, requested that the Project Management Oversight Contractor (PMOC), currently assigned to oversee management of the Honolulu Authority for Rapid Transit (HART) Project, perform a Management Capacity and Capability (MCC) Review of the Honolulu Rail Transit Project (HRTTP) funded by FTA. A report of that review was submitted to FTA on August 30, 2019. HART is responsible for the construction of the project. The City and County of Honolulu Department of Transportation Services (DTS) will take over the operation and maintenance of the system in phases upon completion of each phase.

On January 4, 2021 the HART Board named Ms. Lori Kahikina as the new Executive Director and Chief Executive Officer (ED/CEO). One of Ms. Kahikina's first priorities upon becoming the Executive Director was to evaluate the existing staffing and organizational structure of the agency. This resulted in a major downsizing of the agency staff and the release or leaving of several key managers. Based on this significant reduction in staffing for HART, FTA Region 9 leadership requested that the PMOC provide a re-valuation/update of the OP 21 review that was prepared in 2019. This report is an update of specific sections of the 2019 OP 21 review. (Note this work was directed as a special study through Oversight Procedure 3.) The focus of this update was on staff remaining and organizational structure implemented by the new CEO. The PMOC did not address the full study, but rather focused on HART's current staffing and their capacity to progress the project toward revenue service. This report update indicates new or revised language through the use of italics.

This report update provides the PMOC's findings, recommendations, and professional opinions based on the management capacity and capability of HART to implement revenue service efficiently and effectively. The following is a summary of the PMOC's findings, conclusions, and recommendations. These are the PMOC's observations and recommendations. It is HART's decision on whether and how to implement any of these recommendations.

Project and Organizational Background

Planning and development of the project began in the Rail Transit Division (RTD) of the City's Department of Transportation Services. FTA approved the request by the City and County of Honolulu (the City) to advance the project into Preliminary Engineering (PE) on October 16, 2009. With the start-up of HART on July 1, 2011, RTD ceased to exist and the RTD staff, including the embedded PMC staff, was transitioned to become the core staff of HART. On December 29, 2011, the FTA approved advancement of the Project into Final Design. In its first year, HART management developed and implemented a series of administrative policies and procedures to ensure that good business practices were being employed by HART. The HART Board of Directors completed the recruitment of a permanent Executive Director/Chief Executive Officer (CEO) in April 2012. In December 2012, the City and FTA executed a Full Funding Grant Agreement. Five years later after the project progressed, the Board of Directors, on September 5, 2017, hired its fourth CEO, Mr. Andrew Robbins (Mr. Robbins was the CEO at the time of the 2019 MCC Review). In its early stages, the HART organization consisted mainly of consultants supplementing a limited number of City employees. HART's target for staffing was 135 full-time equivalents at the time of the 2019 study. *In April 2021 HART*

reduced the number of FTEs to 68. Additionally, HART reduced the number of consultant staff working on the project by a similar amount.

Effective July 1, 2017, following the passage of Honolulu City Charter Amendment 4, the State legislature clarified the responsibility of the HART Board of Directors to establish policies and regulations regarding the development of the rail system, the internal management and organization of HART, and the allocation of decision-making authority between the Board and the agency's CEO and staff. The Charter amendment additionally placed the operations and maintenance responsibilities for bus, paratransit, and rail with the City's Department of Transportation Services. With that transfer, HART's responsibilities devolved to design, construction, and start-up of the 20.1-mile rail system.

HART Board of Directors

HART is governed by a 13-member Board, nine of whom are voting members. The Board is the policy-making body of the authority and appoints and evaluates the HART CEO. The Board adopts HART's annual operating and capital budgets, adopts a six-year capital program, adopts rules and regulations, and carries out other duties as authorized by law.

Project Management Plan (PMP)

*As part of the original OP 21 study the PMOC reviewed the PMP as it is HART's seminal document for management of this project. According to Revision 7 of its PMP, "[t]his Project Management Plan (PMP) describes and documents the overall management approach for the Honolulu Rail Transit Project (HRTTP or the Project)." The Plan lists three main purposes, which are relevant to this review:*¹

1. To identify the Project's management procedures and organizational structure.
 2. To provide a guide for the interaction of agencies, organizations, and staff within the Project.
 3. To fulfill the Federal Transit Administration's (FTA's) requirement for a PMP pursuant to 49 CFR Part 633, Project Management Oversight, and establish the framework for administering this project in accordance with the requirements of 49 USC § 5309(e), Core Capacity Improvement Projects; FTA's regulations on Major Capital Investment Projects, 49 CFR Part 611; and FTA Circular 5200.1A, "Full Funding Grant Agreements Guidance."
- *Concurrent with this 2021 update of the Management Capacity and Capability Review, the PMOC is reviewing the draft Revision 8.0 of HART's Project Management Plan.*

The PMOC will produce a separate report on our review of the Project Management Plan.

Conduct of the OP 21 Review

Notice to Proceed for the initial review was May 30, 2019. On June 10, 11, and 13, and July 11, 2019, in Honolulu, the PMOC team conducted 20 interviews of key HART and DTS executives and managers. From these interviews, from our review of resumes, from our review of key management documents, and from observations over more than a year of oversight meetings we developed our findings and conclusions, which led to our recommendations. *During the summer of 2021, FTA Region 9 requested the PMOC update the initial MCC review; however, due to the delays in HART filling key roles the PMOC delayed the start of the review until enough of the key positions had been filled to make an evaluation relevant.*

Summary of Findings

HART, through both direct hires and through its Program Management Support Consultant (PMSC), HDR, has acquired professional resources with adequate experience to manage a rail transit project of this magnitude. Some of the key HART staff who are City employees do not have the directly related experience that would be expected of an Agency with ownership of a project but do have transferrable or valuable other experiences. *Examples are the Director of Quality Assurance and Quality Control, and the Director of Government Relations and Public Involvement. Many of the challenging issues on the Project are related to the requirements for obtaining intergovernmental agreements, and key third-party agreements such as with the Hawaiian Electric Company (HECO) and the universities. Retention and recruitment of qualified staff continues to be an on-going issue. HART's claim that it is difficult to keep staff in a remote island location is valid, especially for getting highly qualified staff to relocate to the island. The HART Organizational structure had placed too much responsibility with the CEO. As it was structured, the responsibility for managing the technical coordination between the Core Systems and Fixed Facilities Design and Construction lies with the CEO. HART's new CEO addressed this issue by putting more of the technical responsibility with the Project Director, which allowed her and the Chief Operating Officer, Mr. Rick Keene, to focus on strategic planning and developing partnerships with key third-party stakeholders such as the City, HECO, and the University of Hawaii.*

HART continues to struggle filling vacancies the key positions of Safety and Security Officer and the Director of Finance.

Conclusions

HART has struggled to advance this project efficiently from the beginning. Unfortunate choices (failure to secure design criteria agreement with the City for utility relocations in City Center) and some difficult circumstances (non-competitive bid environment, lawsuits) have created many of the issues that plagued HART through the project life. The working environment created by the effects associated with project setbacks over the years was not conducive to the creation of a collegial and harmonious team. The staff were working under extreme stress and were constantly subjected to criticisms by both the media and politicians. Simply stated, morale among HART Project staff suffered. It is understandable that the turnover rate was high, especially in leadership roles. Our observation from this update review is that the project team is becoming more cohesive. Morale appears to have improved. That said, HART should

continue to make it a priority of leadership to continue improving project team morale. Although HART has downsized the staff significantly, which created a short-term dip in morale, the quality and morale of the remaining staff and new management appears to be high and should contribute to HART's efforts to completing the project.

At the time of the MCC review, the HART Safety and Security Officer position is vacant. The PMOC was informed that HART is actively recruiting for this position and coordinating with contractors, including HDR, for candidates. In the interim, the HART Safety Consultant is providing assistance to the Project Director on the safety program. Due to Hawaiian labor rules, only HART employees or designated PMSC employees may supervise HART/City employees. HART will need to find a full-time replacement for the Chief Safety Officer either through a direct hire or through an individual being supplied by the PMSC (HDR). Until a permanent replacement is in place, the PMOC will remain concerned about critical safety and security certification tasks being completed.

Recommendations

HART should address three leadership positions immediately. The Director of Finance, who is responsible for supervising Procurement, is a key need for the project now. HART is trying to finalize its delivery method and begin solicitation for City Center Utility Relocation and Guideway and Station construction. HART should acquire or contract with a Utility Coordinator to ensure efficient and speedy coordination with the third-party utility companies along Dillingham Boulevard. Finally, HART needs to fill the vacant Chief Safety Officer position.

As stated previously, the PMOC finds that HART has upgraded many of the key management positions since the 2019 review but is concerned that the magnitude of the overall staff reduction may be too great. The remaining staff has absorbed responsibilities of positions that were eliminated. An example is that procurement and consultant contracts responsibility, which was a fulltime Deputy Director position, was added to the Contract Administrator role. Additionally, the Project Director would benefit from a Deputy that would be able to take some of the day-to-day administrative responsibility of the Project Director as well as relieve the Project Director from having to assume the responsibilities of any manager that leaves the organization. This is especially important considering the HART track record for time it takes to replace key vacancies. The PMOC recommends that HART conduct a workload assessment to address upcoming Project schedule and tasks to complete. The workload assessment should include updated organizational charts, with secondary resource provided for key positions, and resource expectations after phase 1 interim revenue service begins and for City Center construction.

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FULL REPORT

I. PROJECT HISTORY AND BACKGROUND

The Honolulu Rail Transit Project (the Project) consists of design and construction of a grade - separated, 20-mile fixed rail system with 21 stations, a maintenance and storage facility, and 80 light metro automated rail vehicles. The Project extends from East Kapolei to the Ala Moana Center in Honolulu, Hawaii.

HART plans to deliver the project in four guideway sections as described and shown in the figure below:



• Section I	West Oahu/Farrington Highway	East Kapolei to Pearl Highlands	7 miles	6 stations
• Section II	Kamehameha Highway	Pearl Highlands to Aloha Stadium	4 miles	3 stations
• Section III	Airport	Aloha Stadium to Middle Street	5 miles	4 stations
• Section IV	City Center	Middle Street to Ala Moana Center	4 miles	8 stations

Full Funding Grant Agreement:

On December 19, 2012, the City and County of Honolulu acting through its Honolulu Authority for Rapid Transportation (HART), hereinafter referred to as Recipient, and the Federal Transit Administration executed a Full Funding Grant Agreement for the Honolulu Rail Transit Project (the Project). By this Agreement, the federal government committed to support final design and construction of the Project up to a maximum of \$1,550,000 in Capital New Starts funds subject to the terms and conditions set forth in the Agreement. By executing the Agreement, the Sponsor committed to comply with the terms and conditions of the FTA's Master Agreement, FTA MA(19), October 1, 2012, and all successive Master Agreements, which become effective October 1 of each year throughout the lifecycle of the Project (October 1, 2013, October 1, 2014, October 1, 2015, etc.).

FTA Master Agreement:

According to the terms of the FTA's Master Agreement, which is incorporated into the Full Funding Grant Agreement, HART, is required to have and maintain adequate capacity and capability to plan, manage, and complete the Project, in accordance with the approved budget and schedule.²

II. OP 3 REVIEW AUTHORIZATION

FTA issued Hill International, Inc. Notice to Proceed on Work Order No. 2 under Task Order No. 69319518F300093 on May 30, 2019. Work Order No. 2 under the heading of scope, stated: "The contractor shall perform an OP-21 review for the Honolulu High-Capacity Corridor Project. As discussed at the recent HART QRM,³ FTA Regional leadership expressed an urgent need for a management capacity and capability review in a well-timed manner. *Hill completed this task with submission of the report on August 30, 2019.*

On January 1, 2021 the Honolulu Authority for Rapid Transportation (HART) hired a new Chief Executive Officer (CEO) to lead the organization and the construction of the Honolulu Rail Transit Project. The new CEO, Lori Kahikina, undertook a thorough review of the organization and staffing levels relative to the current needs of the project. As a result, HART reduced the management staff from 112 to 64 full-time equivalent positions. Much of the reduction in staff was due to HART releasing the individuals either for performance issues or for the position becoming obsolete due to the changing requirements of the project. Some key positions became vacant as part of this transition: Project Director, Chief Financial Officer, Director of Procurement, Director of Quality Assurance, Director of Construction, Director of Project Controls, Director of Transit Property and Relocation, Chief Safety Officer, Director of Project Delivery, and Director of Readiness and Activation. Due to the significant turnover of the HART Staff, especially in key management positions, FTA directed the PMOC to update the previous OP 21 review as part of an OP 3 Special Task assignment under Task Order 69319520F300006.

The objective of this report is to present the PMOC's evaluation of HART's current management staff. This report will indicate updated information by using italics.

The following is our revised or updated review of HART's management documents, internal procedures, and resumes of key staff, as well as from interviews with HART key staff members.

III. REVIEW ACTIVITIES UNDERTAKEN

The PMOC team (Team) for the original assignment consisted of the following:

Mike Radbill, (Hill) Program Manager

Danny Rogers, (Hill) Task Order Manager II

² FTA Master Agreement FTA MA(19) October 2012

³ QRM means Quarterly Review Meeting

John Bonaparte, (Hill) Civil Engineer I

Robert Merryman, (O.R. Colon) Real Estate Manager

Dain Pankratz, (BCG) Systems safety Manager

Willie O'Neil, (SOL Engineering) Quality Manager

Mike, Danny, and John with the assistance of the Team's subject matter experts conducted 20 interviews in Honolulu on June 10, 11, 13, and July 11, 2019. There were two interviewers for most interviews as shown in the following tables. After the interviews, we collaborated through teleconference discussing findings and reaching consensus on our recommendations.

The chart has been edited from the 2019 report to reflect the status of the employees interviewed during the 2019 review. HART has undergone a substantial turnover in key positions as can be seen below. Of the original 20 positions interviewed in the Summer of 2019, fourteen are no longer working on the project. Additionally, Nate Meddings has been promoted from the Director of Project Controls to The H RTP Project Director. HART has not backfilled the Director of Project Controls position.

Position Title	Staff	Interviewer	2021 Status
DTS Director	Wes Frystacki	MR/DR	<i>Replaced by Roger Morton</i>
DTS Project Manager	Chris Clark	JB/DP	<i>Not Active on Project</i>
HART CEO/Executive Director	Andy Robbins	MR	<i>Replaced by Lori Kahikina</i>
Deputy Executive Director of Government Relations and Public Involvement	Joyce Oliviera	DR/JB	<i>Replaced by Joey Manahan</i>
Project Director	Sam Carnaggio	MR/JB	<i>Replaced by Nate Meddings</i>
Sr. Project Officer, Core Systems, Integration & P3 Delivery	Bob Good	MR	<i>No Change</i>
Director of Transit Property Acquisition & Relocation	Dylan Jones	JB/BM	<i>Replaced by Krista Lunzer</i>
Director of Project Delivery, Integration & Testing	Jeff Siehien	JB/AV	<i>Replaced by Vance Tsuda</i>
Director of Quality Assurance & Quality Control	Alberto Bonifacio	MR/WO	<i>Replaced by Trevor Johnson</i>
Director of Project Controls	Nate Meddings	DR/JB	<i>Vacant</i>
Director of Readiness & Activation	Steve Stowe	DR/DP	<i>Replaced by Patrick Preusser (DTS)</i>
Director of Procurement & Consultant Contracts	Paula Youngling	DR	<i>Vacant The position is now titled Director of Finance</i>
Director of Design & Construction	Frank Kosich	DR	<i>Replaced by Matt Scanlon</i>
P3 Project Manager	Mike Boomsma	MR/JB	<i>Position changed to CCUR Project Manager</i>
Chief Safety & Security Officer	Ralph McKinney	DR/DP	<i>Vacant</i>

Position Title	Staff	Interviewer	2021 Status
Chief Financial Officer	Ruth Lohr	DR	<i>Position changed to Deputy Director of Finance and Budget – Brent Lewis</i>
Utility and Third-Party Contracts Manager	Lindsey Albano	MR/JB	<i>No Change</i>
Director of Planning, Environmental Compliance & Sustainable Mobility	Ryan Tam	DR/JB	<i>No Change</i>
Contract Claims Manager	Dave Diamon	MR/JB	<i>No Change</i>
P3 Construction Management Consultant	Paul Gianellia	DR/DP	<i>Position Eliminated</i>

DR	Danny Rogers	Hill Intl.
JB	John Bonaparte	Hill Intl.
MR	Mike Radbill	Hill Intl.
BM	Bob Merryman	O.R. Colan
WO	Willie O'Neil	SOL Engineering
DP	Dain Pankratz	Boyd, Caton Group
AV	Arun Virginkar	Virginkar Inc.

The PMOC team tasked with the OP 3 update of the 2019 MCC review consisted of Mike Radbill, and Danny Rogers. Additionally, PMOC team members Dain Pankratz (Systems Safety Manager), Dave Coury (Rail Transit Signal & Control Systems Engineer), and Robert Merryman (Real Estate Manager) assisted with HART staff evaluations. The team reviewed HART's staffing and organizational structure to comment on the adequacy of the capacity and capability of HART to manage the H RTP to completion. The PMOC is also reviewing the most recent HART Project Management Plan (PMP) concurrently in a separate task. The following list shows the HART personnel interviewed in 2021 to help assess HART's management capacity. The PMOC did not interview persons that had been interviewed previously, except in the case of Nate Meddings, because he is in a new position.

- 1. Project Director – Nate Meddings*
- 2. Deputy Director of Project Delivery – Vance Tsuda*

3. *Director of Readiness and Activation – Patrick Preusser (DTS)*
4. *Director of Transit Property and Relocation - Ms. Krista Lunzer*
5. *Director of Construction – Matt Scanlon*
6. *Deputy Director of Finance and Budget – Brent Lewis*
7. *Deputy Director of Procurement and Contracts – Dean Matro*
8. *Director of Governmental Relations and Public Involvement – Joey Manahan*
9. *Director of Quality Assurance and Quality Control – Trevor Johnson (not interviewed, but he responded to several written questions)*

IV. ANALYSIS

The PMOC’s review focused on nine project management elements:

1. Organization, qualifications, and experience
2. *HART’s Staffing Plan*
3. HART’s physical resources
4. *HART’s understanding of the work*
5. HART’s methods, policies, and procedures
6. *HART’s management of risks*
7. HART’s approach to managing specific elements of the work
8. HART’s understanding of its obligations under Title VI of the Civil Rights Act of 1964
9. *HART’s understanding of its obligations under the Uniform Relocation Assistance Act*

1. Organization, Personnel Qualifications, and Experience.

HART Interim Executive Director and CEO – Lori Kahikina

Figure 1 below shows the structure of HART’s organization. The HART Structure includes the CEO, Lori Kahikina, at the top of the organization. Ms. Kahikina reports directly to the HART Board of Directors. Although HART is a quasi-City governmental agency, the HART CEO does not have a reporting responsibility to the Honolulu Mayor. The Board of Directors does have a direct connection to City Administration with three of the members being appointed by the Mayor and three members being appointed by the City Council. There are a total of 14 members on the HART Board, although only 9 are voting members.

The CEO is supported directly by a Deputy Executive Director, Mr. Rick Keene, and two Administrative Assistants. The HART CEO has six additional direct Reports including: (1) the Project Director, Nate Meddings; (2) the Director of Quality Assurance, Trevor Johnson; (3) the Administrative Services Officer, Mai Tram Do; (4) the Director of Finance, currently vacant; (5)

the Director of Government Relations and Public Involvement, Joey Manahan; and (6) the Chief Safety Officer, position vacant.

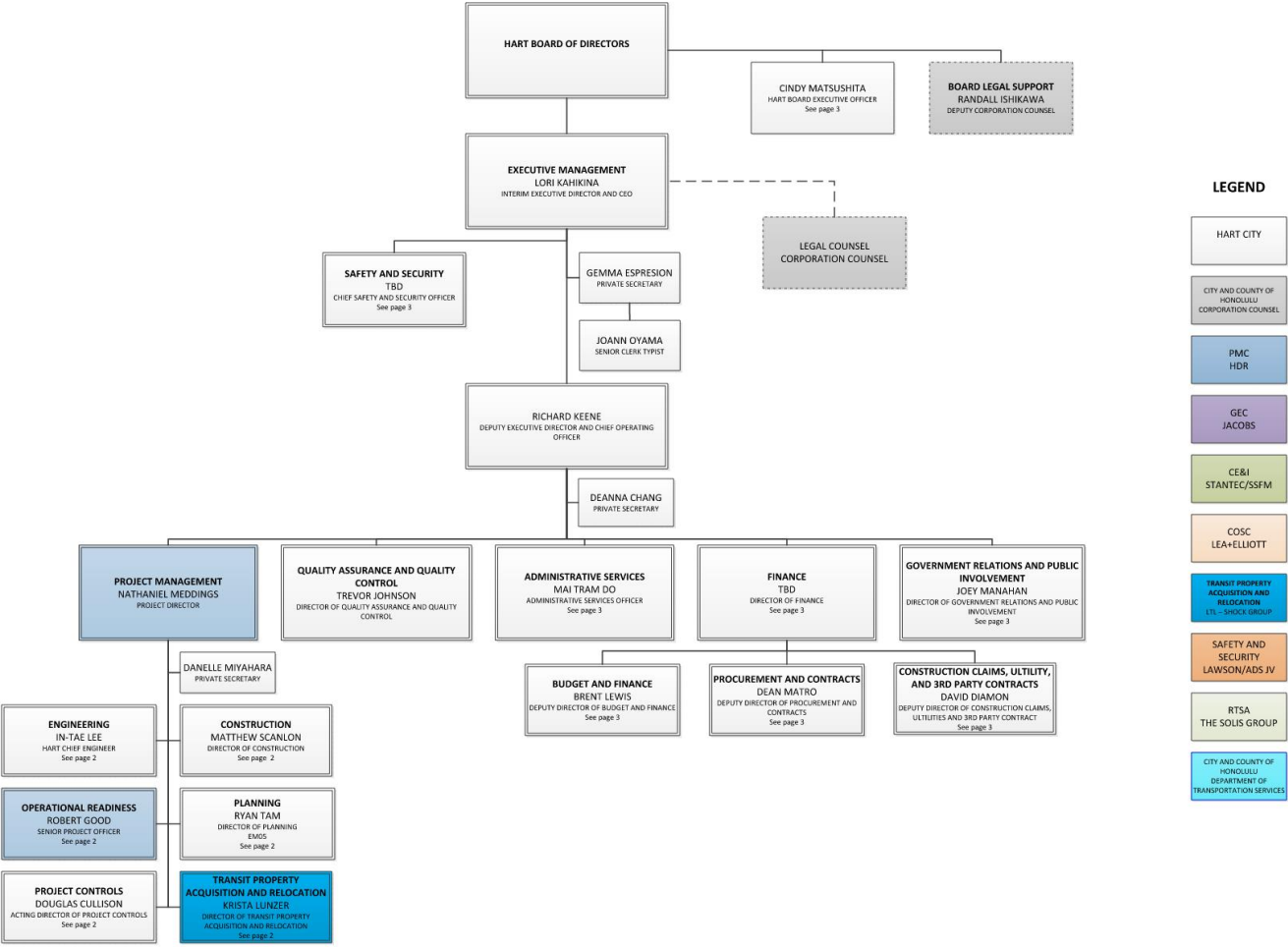
The main difference between Ms. Kahikina's organization and the previous leadership is that all project development activities report directly through the Project Director. The Project Director manages the Directors of Planning, Engineering, Transit Property and Relocation, Construction, Operational Readiness, and Project Controls. Previously Transit Property and Relocations, and Operational Readiness reported directly to the CEO, and Project Controls reported to the Chief Financial Officer. The PMOC sees this structural change as appropriate and an improvement. See Figure 1 on the next page.

The Interim Executive Director and CEO, Lori Kahikina has limited experience in transit but does understand the City and the Hawaii construction culture. In the short tenure that Lori has been in the position, the PMOC has seen much more openness and sharing of information than previously. Additionally, Ms. Kahikina has developed much stronger relationships with the City and other critical third-party partners. The PMOC views this change as a significant improvement. The biggest concern the PMOC has observed with HART since Ms. Kahikina assumed the CEO role has been the difficulty HART has had in keeping key management positions filled; however, the PMOC does acknowledge that several key positions have been filled recently.

Figure 1: HART Organization

HONOLULU AUTHORITY FOR RAPID TRANSPORTATION

NOVEMBER 10, 2021



The following paragraphs discuss elements of the HART organization and provide the PMOC's assessment of HART's key management team.

Project Director – Nate Meddings

As stated previously project management activities are directed through the Project Director. The HART Chief Engineer (Design), Director of Construction, Director of Operational Readiness, Rapid Transit Planning Manager, Director of Project Controls, and the Director of Transit Property and Relocation report to the Project Director. This structure allows the Project Director to have a complete understanding of how the project is developing and ensures that all areas of Project Development are coordinated and communicating. Additionally, this structure allows the HART CEO to concentrate on strategic concerns and partnerships. Specifically, Ms. Kahikina has been able to focus on repairing the working relationship with key City and State stakeholders, as well as important third parties like Kamehameha Schools and the University of Hawaii.

One of Ms. Kahikina's first major actions was to name a new Project Director. She chose to promote Nate Meddings from the Project Controls Manager position. At the time this change was made, Mr. Meddings had been on the HART project approximately two years. Prior to coming to HART, Mr. Meddings had worked on a major P3 highway project in Arizona as the Project Controls Manager. Mr. Meddings' previous transit experience was with a streetcar project in Tucson, Arizona. The initial PMOC assessment of this move was that Mr. Meddings lacked significant experience leading a major capital project and the PMOC was concerned that he was not ready for the Project Director role. Since taking over this role in early 2021, Mr. Meddings has proven to be an insightful and dedicated manager for the project. He has shown great leadership and has been very receptive to staff input as well as feedback from the FTA and PMOC. Mr. Meddings has demonstrated he is well qualified and a good fit for this role.

One of the most significant organizational changes made by Ms. Kahikina was to move the Core Systems and Real Estate groups back under the Project Director. This was key to ensuring that all aspects of project development are coordinated. It is critical for the Real Estate group to know the priorities for the properties, as well as the property's' importance to the fixed facilities or Core Systems group's needs. Conversely, the Real Estate group needs to know the ramifications potential design changes may have on the real estate schedule. In addition to Core Systems and Real Estate, Mr. Meddings manages the Director of Construction, Director of Engineering, Director of Project Controls, and Director of Planning. Of the positions reporting to the Project Director, only the Director of Operational Readiness, Mr. Bob Good; the Director of Engineering, Mr. In-Tae Lee; and the Director of Planning, Mr. Ryan Tam, remain from the 2019 report. The Director of Transit Property and Relocation is now occupied by Ms. Krista Lunzer. The Director of Construction is held by Mr. Matthew Scanlon. The Director of Project Controls position is still vacant.

Director for Operational Readiness (Core Systems), Mr. Bob Good

Mr. Good appears to have embraced this change in reporting structure. Bob is one of the few people remaining in the same position as he was during the original MCC review in 2019. He remains one of the stronger assets for HART with significant experience and expertise in rail transit and expertise in transit systems. With the cancellation of the P3 contract in December 2020, Mr. Good has been able to focus solely on completing the initial segment of the project. Although he held the same position during the 2019 review, the ability for him to concentrate on Core Systems solely is an overall improvement to management of the project for HART. Mr. Good's Core Systems organization is divided into two groups, Project Delivery, Integration, and Testing headed by Vance Tsuda, and Readiness and Activation. HART's Readiness and Activation activities that were formerly led by Steve Stowe, are now led by Patrick Preusser, Director of Rapid Transit, with the City and County of Honolulu's Department of Transportation Services (DTS).

Deputy Director of Project Delivery – Vance Tsuda

*Vance Tsuda, who was recently promoted to Deputy Director of Project Delivery, Integration, and Testing, is “responsible for managing the DBOM Core Systems Contract, as well as development, maintenance, and implementation of the System Integration Test Plan (SITP) (RD-45) for the Project. He is also responsible for procurement of the passenger vehicles, train control, and traction electrification system.”⁴ Vance Tsuda replaced previous Director Jeff Siehien and worked closely with Mr. Siehien to ensure successful transition. Mr. Tsuda, with a BS in Electrical Engineering from University of Hawaii, has been working on the Project since 2015. The PMOC was informed that HART eliminated the Director of Project Delivery, Integration, and Testing position. Mr. Tsuda informed that with the proposed engineering staffing and Project schedule, the Director position should not be necessary. However, there is vacancy in the engineering position(s). Mr. Tsuda reports directly to Mr. Bob Good, the Director of Operational readiness.-- **Mr. Tsuda has demonstrated during his interviews and previous PMOC coordination to possess the technical competence and background to manage the Project Delivery, Integration, and Testing effort;** however, the Project Delivery department's staffing is significantly reduced and currently has vacancies. **As part of the recommended workload assessment, HART should review staffing levels for resources supporting Project Delivery, Integration, and Testing.***

Director of Readiness and Activation – Patrick Preusser (DTS)

Mr. Preusser has an MS in Public Administration from University of Southern California and MS in Transportation Management from University of Denver. Mr. Preusser has been working with DTS overseeing this Project since 2019 and worked with TriMet in Oregon prior to that. As Director of Readiness and Activation (DRA), he is “responsible for pre-operational activities for operations and maintenance of the transit system. His primary role

*in this position is to develop the Rail Operations and Maintenance Plan (OMP) (RD-20) and the Rail Fleet Management Plan (RD-21) in preparation of future operations and maintenance of the Project. (Note: Mr. Preusser remains the Director of Rapid Transit for DTS). As the revenue service date approaches, the DRA will support the transition of duties from HART to DTS. During interviews, DTS confirmed that transitioning the DRA position from HART to DTS is preferred and consistent with industry practices. From his briefings to the PMOC at oversight meetings, **Mr. Preusser demonstrated the technical competence required for his position, and has support resources available.***

Director of Transit Property and Relocation - Ms. Krista Lunzer

*The Transit Property and Relocation (TPAR) group has traditionally been an area of concern for the agency and the PMOC. HART has employed TPAR Directors that were well versed in real estate processes but were not experienced with project management. Although HART was able to process property access, it struggled with actual acquisition and coordinating, or meeting schedules needed to progress construction on the project. This was an issue that was exacerbated by having the TPAR group reporting to the Chief Operating Officer rather than the Project Director. As stated earlier, Ms. Kahikina released the Real Estate Director early in her tenure and began a search for a replacement. After several months of not being successful in hiring someone to the HART staff, Ms. Kahikina directed the HART Real Estate consultant to provide a real estate manager. Ms. Krista Lunzer was identified by W.D. Schock to take on the TPAR Director role on a temporary basis, while HART continued its search for a full time TPAR director. Ms. Lunzer began to manage the real estate activities in early summer. During this period the organization and progress of the acquisition effort improved significantly. HART recognized the improvement and took steps to allow Ms. Lunzer to continue to act as the Real Estate Director for the foreseeable future. Although Ms. Lunzer cannot act as HART's agent, she does the majority of the TPAR management, and reports to the HART Project Director for official actions. **The PMOC believes this change to the HART structure and management team to be a significant improvement.***

Rapid Transit Planning Manager – Ryan Tam

The PMOC interviewed Ryan Tam, Director of Planning, Environmental Compliance, and Sustainability as part of the 2019 MCC review and made the following observations:

Mr. Tam is “responsible for the development and maintenance of the Mitigation Monitoring Program (RD-1), the Bus Fleet Management Plan (RD-22), and the Before-and-After Study Plan (RD-6) to ensure compliance with the FEIS and Record of Decision (ROD). Specific duties include planning, directing, integrating, and monitoring the joint development efforts. Dr. Tam is also responsible for application and compliance with the FTA and other applicable federal and state regulations, including the Uniform Act. He is considered the HART Chief

Planner and Environmental Compliance Manager. He is also responsible for ensuring the Project meets relevant FTA New Starts criteria related to planning and environment.”⁵

Ryan, with a PhD in Urban and Regional Planning and an MS in Transportation was a transportation planner for the City and County of Honolulu, and a Transportation Planning Consultant in Boston, MA. He also received an Arts of Leadership certification from the University of Hawaii. Mr. Tam briefed the PMOC at numerous oversight meetings on environmental and sustainability issues affecting the HART project. He demonstrates a strong understanding of technical requirements of his position, as well as a sensitivity to the cultural aspects of the HART Project. **The PMOC believes Mr. Tam is well qualified for his position.**

HART Chief Engineer – In-Tae Lee

*Although, the PMOC did not interview Mr. In-Tae Lee in 2019 nor during this update, the PMOC has observed Mr. Lee’s performance during this time frame. Mr. Lee is one of the longest tenured people on the HART team. His role has been and continues to be as the lead for design. Initially, Mr. Lee was over fixed facilities design, and more recently Mr. Lee has been promoted to the head of Engineering and reporting directly to the Project Director. He has demonstrated over the time that Hill International has been assigned the PMOC role for the project (since mid-2018) that he has a clear understanding of project issues. **The PMOC believes Mr. Lee is well qualified to continue in the Director of Engineering role.***

CCUR Project Manager/Assistant to the Chief Engineer – Mike Boomsma

*Mr. Boomsma reported to Bob Good previously but has since transferred to work under the guidance of the Chief Engineer. Mr. Boomsma has a BS in Systems Engineering and an MBA. He is a Certified Public-Private Partnership Professional and is a Registered Professional Engineer in Hawaii. He is responsible for technical solicitation documents, coordination of technical matters with the City of Honolulu’s Department of Transportation Services (DTS) and technical discussions aspects of the procurement for the City Center contracts. Additionally, his resume states that he was the “lead author of all technical procurement documents.” Based on his resume and information gleaned from his interview in 2019, it is the **PMOC’s opinion that Mr. Boomsma is qualified for the work he has been assigned.***

Director of Construction – Matt Scanlon

Mr. Scanlon assumed the position of HART Construction Manager in September 2021. Prior to coming to HART in the Construction Manager position, Mr. Scanlon had worked for HART from 2012 through 2015 as a Project Manager. Between the two stints with HART, Mr. Scanlon was employed by Caltrain in San Carlos California. Mr. Scanlon’s role at Caltrain was as the Deputy Director for Railroad Systems and Maintenance. At the time of the interview, the PMOC had not

had an opportunity to observe Mr. Scanlon's work, so the comments provided are based solely on the interview and the information gleaned from his resume.

Mr. Scanlon came across as confident and knowledgeable about transit construction. It will be important for him to develop positive relationships with the existing HART staff, especially his direct reports. The workload for the project is in a less demanding phase with only the Airport Guideway and Stations section in major construction activity currently. That section is managed by John Moore, who, in the opinion of the PMOC, is one of the strongest assets of the project's construction management team. The other activity currently demanding time from the Director of Construction is the closeout of the west side station contracts. This is an optimum time to bring in a new Director, so Mr. Scanlon has an opportunity to ease into the role.

The PMOC believes that HART selected a capable candidate for the Director of Construction role; however, HART should monitor Mr. Scanlon's performance and interaction with the construction team to ensure that the chemistry of the team is positive.

Director of Finance – Vacant

The Director of Finance is a key role for HART. This position is responsible for budget, finance, procurement, and contracts for the agency. The status of the HART project is precarious due to several major construction contracts that need to be procured, and a major revenue shortfall projected for the project. This position is critical as HART works to develop a recovery plan for the project. Understanding the cash flow needs as well as financing opportunities to move the project forward is critical. HART must work with the City Council and the State Legislature to identify the funding possibilities to advance as much of the project toward completion as possible.

Although this position is listed as vacant, HART has indicated that it is negotiating with a desired candidate but cannot release the name until an agreement is reached. Until HART fills this role, the PMOC will continue to consider this a significant risk to the project.

Deputy Director of Finance and Budget – Brent Lewis

At the time of the interview with Mr. Lewis, he was in his first week of his tenure with HART and was still learning about the organization. The PMOC was able to discuss with Mr. Lewis about his previous experience with budget and finance in a government agency. Mr. Lewis worked with the City and County of San Francisco from 2007 through 2016 where he served as the Deputy Director, CFO, and IT director of the Human Resources Department. Prior to that time, he worked in the Public Works Department within the City and County of San Francisco. While he was with the Public Works Department, he worked with capital projects and grant funded projects.

Mr. Lewis will support the Director of Finance when that position is filled. Until that time he will work with the COO, Mr. Rick Keene. Mr. Lewis seemed to be knowledgeable about his expected role and appears to be qualified. With the support of Mr. Keene, and then the new Director of Finance, Mr. Lewis seems capable of succeeding in this position.

Deputy Director of Procurement and Contracts – Dean Matro

*Mr. Matro has worked with HART since 2015. He started as a Contracts manager, then moved to Deputy Director of Contract Administration. He was promoted to the Deputy Director of Procurement and Contract Administration when the Deputy Director of Procurement resigned from HART in July 2021. This position reports to the Director of Finance which has been and remains vacant. The PMOC considers this position as critical to the success of the project. HART has several major procurements coming up over the next couple of years. HART needs to secure contracts for the City Center to relocate utilities and the to construct the Guideway and Stations. Both contracts have been advertised unsuccessfully and are the biggest risks to the project cost and schedule remaining. Mr. Matro has significant experience in contract administration but has limited work with procurement. His previous experience was with State of Hawaii-Hawaii Health Systems Corporation. He has no recent experience with federal procurement requirements. **The PMOC finds that Mr. Matro is well qualified for his work on contract administration, but that Mr. Matro's limited procurement experience is a concern.***

Deputy Director of Construction Claims, Utilities and Third-Party Contracts – Dave Diamon

*The PMOC did not interview Mr. Diamon for the 2021 Update, but the comments from the original review are still valid. Mr. Diamon has a BA in English and a JD both from the University of Wisconsin. David's resume traces his experience back to 1997; however, his construction claim experience seems to begin in 2013 when he was a Senior Contracts and Compliance Manager in the Middle East. In that position, Mr. Diamon, according to his resume, was a "contract manager on a large design/build construction project for \$900 million aviation maintenance, repair, and overhaul facility." Based on his resume and responses to interview questions, it is the **PMOC's opinion that Mr. Diamon lacks sufficient construction claims experience for the position he occupies.** The PMOC acknowledges that Mr. Diamon now has an additional two years' experience since this review was originally made without any major concerns surfacing. Concern is diminished somewhat because the construction claim packages, he assembles are reviewed by the City's Corporation Counsel.*

Director of Governmental Relations and Public Involvement – Joey Manahan

Mr. Manahan's background is local, and state elected office. Mr. Manahan doesn't have any significant experience in transit project public involvement. Through the discussion with Mr. Manahan, it became clear that his focus was on elected officials. Based on the need for HART to garner more local government support, this may be appropriate, but public outreach to the affected community is still a basic responsibility of the project sponsor. Mr. Manahan has a project team that consists of four information specialists (one position is currently vacant) and one multi-media specialist. Mr. Manahan stated that he anticipates adding staff when the City Center construction begins in earnest.

*Although Mr. Manahan has important connections to key elected decision makers, the **PMOC is concerned with Mr. Manahan's lack of transit project experience for community outreach.***

Director of Quality Assurance and Quality Control – Trevor Johnson

*Mr. Johnson had not started with HART at the time the formal interviews were held, but the PMOC was provided with Mr. Johnson's resume to review. Additionally, the PMOC did send Mr. Johnson some follow-up questions once he started on November 8, 2021. Mr. Johnson does not have a transit background, but he does have over 25 years' experience with the quality department within Boeing Aircraft Manufacturing. His last three years he served as a Quality Director for several of their major programs. **Mr. Johnson's experience is impressive, and the responses he gave to the PMOC inquiries about his focus at HART gives the PMOC confidence that Mr. Johnson has the potential to be a positive addition to the HART staff.***

Chief Safety and Security Officer - Vacant

At the time of the review, HART's Chief Safety and Security Officer (CSSO) position was vacant. Previously Ralph McKinney, then Read Dwari held this position. Additionally, the resources supporting safety and security have been reduced to match project completion and schedule. The PMOC was provided documentation that HART organization has been restructured to allow the CSSO to report directly to the CEO in compliance with 49 CFR Part 674.29

*The CSSO "is primarily responsible for the development, coordination, and implementation of the Project's Safety and Security Management Plan (SSMP) (RD-27). The SSMP describes how HART plans to address safety and security throughout all phases of the Project and is further discussed in Section 15 of [the] PMP. The HART CSSO serves as the primary point of contact for all matters related to safety and security. The HART CSSO is responsible for overseeing the contractually required safety and security plans developed and implemented by all Project Contractors. The CSSO is critical to ensuring safety and security certification for successful startup. The CSSO also coordinates with HDOT State Safety Oversight for startup activities including resolution of action items identified in HDOT reviews. **The PMOC believes the filling the CSSO position and developing a responsibility matrix ensuring CSSO duties are assigned should be high priority for HART.***

HART does not have a Chief Safety and Security Officer supporting the Project. As part of the recommended workload assessment, HART should review staffing levels for resources supporting Safety and Security.

HART's Staffing Plan

HART's most recent Draft Staffing Plan is Revision 8.0 dated October 2021. The Plan is divided into six sections:

- 1. Introduction*
- 2. Project Management Structure*
- 3. Recruitment*
- 4. Staff Training*

5. Staff Support Services

6. Staff Retention and Succession Planning

The PMOC reviewed the Staffing Plan for this assignment. The Plan acknowledges the difficulty of attracting a qualified work force due to the remote location of O’ahu. *The Staff Management Approach section states that the “positions and timeline reflected in the Plan are based on the assumption that at the conclusion of segment 3, “HART will transfer all remaining assets and intellectual property to DTS, and the remaining HART staff will then be eligible for a DTS position with the advantage of having prior experience working with the project.”*

The Plan notes that the Project is supported by City employees, whose acquisition is guided by City Policies and Procedures. *HART staff is acquired with Personal Services Contracts (PSCs), which can expedite the acquisition process. The normal timeline for acquisition of permanent civil service City staff is quite lengthy. Employees hired as PSC employees may eventually transition to City employees once rail operations and maintenance responsibilities are transferred to DTS.* PSCs may be written for up to 12 months, coinciding with the City’s fiscal year. PSC hires are afforded the same benefits as permanent civil service employees. Hiring consultants is acknowledged by the Plan. Consultants are hired when the HART staff does not possess the necessary qualifications for specific areas or for urgent needs. Acquisition of staff through consultants is governed by HART’s procurement regulations as well as government labor laws.

The Plan notes that City Civil Service Rules, to enhance recruiting, the Director of the Department of Human Resources can provide compensation for some travel and transportation expenses, as well as provide a monetary incentive, in the form of a pay differential to incentivize potential applicants.

Section 4 of the Plan addresses the various types of training required and offered to new employees as well as for annual refresher training. Included in the training is familiarization with the Project Management Plan, Quality Plan, Safety Plans, and many more.

Section 6 of the Plan addresses retention and succession planning. Due to the temporary nature of HART as an agency, some current HART positions could transition to DTS positions. According to the Plan, HART employees on PSCs are eligible to apply for permanent civil service positions with DTS as the positions are created and become available. When HART civil service positions become vacant, HART works with City Department of Human Resources to recruit new employees.

Despite the processes and options available to recruit and retain staff, HART continues to be challenged to recruit and retain qualified staff. The PMOC recognizes that the current labor market presents significant challenges in locating and hiring qualified staff. It appears that HART has all the right tools City and State regulations permit to recruit and retain staff. ***The PMOC observation of the current leadership at HART on hiring practices is that HART is committed to acquiring qualified staff within the norms of the City and County of Honolulu practices. HART is cognizant of avoiding major pay disparities between HART and City staff for similar positions. HART has practiced patience and diligence in finding qualified resources for key positions. This effort appears to be paying off with recent hires. Fortunately for HART the project was in a period***

that allowed this type of practice to occur without jeopardizing the progress of the project. As the project moves back into active construction on multiple sections, HART will need to be more efficient in its recruiting practices.

2. HART's Physical Resources

The PMOC has observed the physical resources HART makes available to its staff to perform their work. It is our opinion that HART has secured adequate office space, equipment, and all furnishings for their team to effectively and efficiently manage a project of this size and complexity to a successful completion.

3. HART's Understanding of the Work

The PMOC has commented previously in this report about the qualifications of HART managers. We believe these managers understand the complexities of the work, as well as how to approach their work to accomplish it efficiently with quality and within budget. We have seen, as is common in such mega projects, different persons have different approaches to solving construction issues. *What concerned the PMOC under previous leadership was the lack of good communication among senior managers over the approach to the utility relocation in advance of the start of the P3 contract.* What we are saying is that understanding the work is not the problem, what is the problem is the lack of collaboration on problem solving to agree on an approach. *We attribute this lack of collaboration to HART's previous approach to staffing and organizing senior level managers. Changes to the organizational structure with the new leadership appears to be creating a more cohesive team with much better communication.*

4. HART's Methods, Policies, and Procedures

The PMOC did not update this portion of the 2019 report. The PMOC is reviewing the PMP in a concurrent activity. As part of HART's PMP update all of the management plans shown here have been or are in the process of being revised.

The PMOC reviewed HART's management plans, policies, and procedures to aid in our analysis of HART's capacity and capability to develop a federally assisted capital project. We reviewed HART's 18 management plans. The plans address scope, management duties and responsibility by position title appropriate to the subject of the plan. They also address documentation for record purposes. It is the opinion of the PMOC that the management plans that were all recently updated, 15 of 18 were updated in 2019, are complete and sufficient as tools to aid in the management of the project.

HART Management Plans
Bus Fleet Management Plan
Buy America Plan
Configuration Management Plan
Construction Management Plan
Construction Safety and Security Plan
Interface Management Plan
Mitigation Monitoring Plan
Operation and Management Plan
Project Management Plan
Quality Management Plan
Rail Activation Plan
Rail Fleet Management Plan
Revised Recovery Plan
Safety and Security Management Plan
Staffing & Succession Plan
System Integration & Test Plan
Real Estate Acquisition Management Plan
Risk & Contingency Management Plan

The Project Management Plan, last published in January 2018, needs to be updated, and this should be a HART priority. The Plan lists three main purposes, which are relevant to this review:⁶

- “To identify the Project's management procedures and organizational structure.
- To provide a guide for the interaction of agencies, organizations, and staff within the Project.
- To fulfill the Federal Transit Administration's (FTA's) requirement for a PMP pursuant to 49 CFR Part 633, Project Management Oversight, and establish the framework for administering this project in accordance with the requirements of 49 USC § 5309(e), Core Capacity Improvement Projects; FTA's regulations on Major Capital Investment Projects, 49 CFR Part 611; and FTA Circular 5200.1A, “Full Funding Grant Agreements Guidance.”

In February 2019, the PMOC reviewed Revision 7 of HART's PMP and sent our recommendation for approval to FTA Region 9 that same month; however, since then, the HART organization has undergone significant changes that warrant an update to the PMP. From our current review, we found:

- PMP Revision 7 does not fully satisfy stated purpose No. 1 in that it does not accurately identify the Project's organizational structure on many levels,
- PMP Revision 7 does not satisfy stated purpose No. 2 in that it does not accurately provide a guide for the interaction of agencies. This is particularly notable with respect to DTS, HART Core Systems organization, and Hawaii DOT State Safety Oversight Office.
- PMP Revision 7 does fulfill stated purpose No. 3.

Specifically, the new HART organization contains new positions, of which the COO is most significant. This new position creates new reporting relationships. There is no written description of the duties and responsibilities of the COO. The MOU between HART and DTS has been agreed upon and should be reflected in an updated PMP because there are new duties and responsibilities and new lines of communication between HART and DTS that need to be defined. Details of the revised Recovery Plan should also be incorporated into a revised PMP.

In addition to management plans, the PMOC reviewed thirty HART procedures to confirm whether each clearly articulates the following eight elements:

1. HART policy
2. Purpose
3. Scope
4. Definition of terms used in the procedure
5. Person/persons responsible for action, identified by position title, who manage the project
6. Procedures/process, either in words, through the use of flow charts, or both, and contains time frames for action

⁶ HART PMP, Rev. 7.0, December 7, 2018, p. 19.

7. Deliverables

8. References, if any

The PMOC observed that all procedures appeared comprehensive, understandable, and up to date. However, with the exception of the Procurement Manual, all procedures lacked a policy statement. The “Procurement Standards of Conduct” procedure does not involve a process (element 6), and there are no deliverables (element 7). Its purpose is to articulate a type of behavior. This is satisfactory. The format of the “Executive Decision Document” (EDD) did not follow the format of the other procedures, but this did not detract from it clearly describing responsibilities and process. Finally, the “Petty Cash” procedure has no references particularly not to the City and County of Honolulu Department of Budget and Fiscal Services, which it mentions in the procedure. In summary, we found that HART has produced a full complement of plans and procedures documents that is sufficient to guide its management in advancing the project through revenue service.

	HART Procedures Reviewed
QA	Meeting Minutes Procedure
	Submittal Processing Procedure
	Project Procedure and Plan Revision and Control Procedure
Procurement	Procurement Standards of Conduct Procedure
	Procurement Methods Procedure
	Procurement Full & Open Competition Procedure
	Procurement Federal Compliance Procedure
	Procurement Protests Procedure
	Procurement Record Keeping Procedure
	Executive Decision Document Procedure
	Project Closeout Procedure
	Contract Change Procedure
	Procurement Manual (HART)
Project Controls	Project-wide Document Control & Project Library Procedure
	Contract Management System Procedure
	Project Progress Report Procedure
	Project Scheduling Procedure
	Cost Estimating Procedure
	Cost Control Procedure
	Contingency Management Procedure
Finance	Contractor Payment Application Procedure
	Consultant Invoice Payment Procedure
	Petty Cash Procedure
	Travel Procedure
Other	Incident Investigative Procedure
	Environmental Procedure
	RFI Processing Procedure
	Identification badge Procedure
	Training Procedure
	Risk Management Procedure

5. HART’s Management of Risks

The PMOC has attended numerous briefings and breakout sessions with HART’s previous Risk Manager, Paul Johnson. Paul took every opportunity to attend PMOC briefings and other discussions and briefings to learn where risks were developing or diminishing. Paul drafted and updated HART’s Risk management Plan. **HART had an exceptionally well qualified Risk Manager in Paul Johnson. Mr. Blane Long replaced Paul Johnson in early 2021 as the Risk Manager for the project. Mr. Long is well qualified in this role. The HART Risk Management Program seems to be thorough and regularly updated.**

HART’s Approach to Managing Specific Elements of the Work

HART has a strong Project Director and appears to have a very capable staff over core systems and the main major construction package currently underway (AGS). Additionally, HART has an experienced team from its CE&I consultant (Stantec). HART has hired several new people that appear to be competent and should help as the project moves into the City Center. HART does have a new team, Construction Manager and CE&I consultant, working to close out the westside contracts. This transition may be part of the reason for the extended time it has taken to complete

the last of the westside work. It is the PMOC's opinion that the delays are more of a result of the previous staff than a reflection on the current staff.

*The completion of the H RTP is dependent on completing utility relocations along Dillingham Boulevard in City Center. The critical path goes through this section. Additionally, Dillingham Boulevard is at the western most end of Segment 3, and all alternatives HART is considering as it develops a Recovery Plan to complete the project require completion of this work. It is imperative that this contract goes smoothly and quickly. Utility relocation is historically the portion of a major transit project that contains the most risk due to the interaction with multiple third parties. The current HART management structure identifies a project manager, Mike Boomsma, and a CE&I team to work through the utility relocations. It does not currently identify the use of a Utility Coordinator to help maintain continued communications with the local utility companies. Ideally, this individual would be a person with a history of working with the utilities that need to be relocated. This person would be tasked with ensuring that HART understand and anticipate the needs of the utilities to help expedite and coordinate work between each entity. **The PMOC strongly recommends the engagement/identification of a dedicated Utility Coordinator to work through the relocation of utilities along Dillingham Boulevard.** Additionally, the person filling this position should already be on board to help foster positive relationships and ensure smooth transitions between work to be performed by or for each of the utilities.*

6. HART's Understanding of its Obligations under Title VI of the Civil Rights Act of 1964, the Disadvantaged Business Enterprise (DBE) Program, and the Americans with Disabilities Act

HART does not currently have a dedicated Civil Rights Officer to enforce this requirement. The PMOC recommends that FTA coordinate with HART and the City and County of Honolulu to ensure this area is being addressed adequately.

7. HART's Understanding of its Obligations under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970

In July 2019, HART underwent an audit of its compliance with the Uniform Act. FTA has not published the results of that audit. **The PMOC defers to the audit report for an assessment on HART's compliance with the Uniform Act.**

V. FINDINGS

- 1. HART has significantly restructured the organization. The span of control for the CEO has been reduced to an appropriate reach. All Project Construction management activities have been moved under the Project Director. This change allows the Project Director to focus on creating an opportunity for the project team to build the project while the CEO addresses political, third party, financial, and strategic issues to move as much of the project forward to completion as possible.*
- 2. HART has reduced the staff, including consultants, by about half. This change is consistent with the reduction in construction activity on the project. The westside contracts are nearing completion and working toward closeout. The Utility relocation*

contract in City Center was terminated, and no activity is going on there, other than design. Although the PMOC is concerned with some key positions that have remained vacant for a significant amount of time, we are comfortable with the recent hires to fill some of these vacancies. It is the PMOC's position that the reduction in staff was prudent to reduce monthly overhead costs; however, HART must ensure that it allows ample time to re-fill some of these positions in anticipation of letting the City Center Construction contracts.

VI. CONCLUSIONS

It is the PMOC's opinion that:

1. *The current proposed organizational structure is appropriate but needs continued evaluation for sufficiency as the project moves back into major fixed-facilities construction.*
2. *Staff appears to be individually competent. It is important that the new staff are incorporated into the team without disrupting the cohesiveness that appears to have developed over the past year.*
3. *Obtaining and retaining qualified professional personnel is a major challenge due to location, stress level, and salary restrictions.*

VII. RECOMMENDATIONS

1. *HART should address three key hires immediately.*
 - a. *The **Director of Finance**, to whom Procurement reports, is a critical need for the project now. HART is trying to finalize its delivery method and begin solicitation for City Center Utility relocation and Guideway and Station construction.*
 - b. *HART should contract with a **Utility Coordinator** to ensure efficient and speedy coordination with the third-party utility companies along Dillingham Boulevard.*
 - c. *Finally, HART needs to replace the **Chief Safety Officer**.*
2. *The PMOC finds that HART has upgraded many of the key positions from the staff that was available during the 2019 review, but is concerned that the magnitude of the overall staff reduction may be too great. The PMOC recommends that HART conduct a workload assessment to address current Project schedule and tasks completed. The workload assessment should include updated organizational charts, with secondary resource provided for key positions, and resource expectations after phase 1 interim revenue service begins and for City Center construction.*
3. *HART should start a training program for managers that addresses communication up, down, and across the organization; and caring for and development of subordinates. Invite subordinates to HART sponsored Town Hall Meetings.*

VIII. APPENDICES

APPENDIX A – LIST OF ABBREVIATIONS, ACRONYMS, AND INITIALISMS

ADA	Americans with Disabilities Act
BA	Bachelor of Arts
CFO	Chief Financial Officer
CFR	United States Code of Federal Regulations
CSSO	Chief Safety and Security Officer
CY	Calendar Year
DAGS	Department of Accounting and General Services (State of Hawaii)
DAR	Director of Transit Property Acquisition & Relocation
DED	Deputy Executive Director
DLNR	State of Hawai'i, Department of Land and Natural Resources
DOT	Department of Transportation
DQA	Director of Quality Assurance and Quality Control
DTS	City and County of Honolulu, Department of Transportation Services
EDD	Executive Decision Document
FTA	United States Department of Transportation, Federal Transit Administration
HART	Honolulu Authority for Rapid Transportation
HDOT	State of Hawai'i, Department of Transportation
HDR	Consultant to HART
HECO	Hawai'ian Electric Company
H RTP	Honolulu Rail Transit Project
MA	(FTA's) Master Agreement
MCC	Management Capacity and Capability
MOU	Memorandum of Understanding
OMP	Operations and Maintenance Plan
O'ahu MPO	O'ahu Metropolitan Planning Organization
OCIP	Owner-controlled Insurance Program
OP	Oversight Procedure
P3	Public-Private Partnership
PD	Project Director
PE	Professional Engineer
PMOC	Project Management Oversight Contractor
PMP	Project Management Plan
PMSC	Program Management Support Consultant
QA	Quality Assurance
QAP	Quality Assurance Plan
QC	Quality Control
QMP	Quality Management Plan
ROD	Record of Decision
SITP	System Integration Test Plan
SSMP	Safety and Security Management Plan
SSO	State Safety Oversight
USDOT	United States Department of Transportation

APPENDIX B – HART KEY STAFF RESUMES (Under separate cover)

APPENDIX D – PROJECT MANAGEMENT OVERSIGHT CONTRACTOR TEAM

Qualifications (including resumes) of the Project Management Oversight Contractor's (PMOC) team can be found in its technical proposal to the Federal Transit Administration (FTA). Any changes to key PMOC staff for this project's task order, which differ from the technical proposal, were provided to FTA as part of the PMOC's task order proposal. Key PMOC team members currently assigned to this Work Order No. 2 scope of work are as follows:

PMOC Team Member	Organization	Role	Phone No.	E-mail Address
Michael Radbill, PE, F.ASCE	Hill International, Inc.	Program Manager	215-309-7926	michaelradbill@hillintl.com
Danny Rogers, PE	Hill International, Inc.	Task Order Manager	919-214-1921	dannyrogers@hillintl.com
John Bonaparte, PE, PMP, RMP	Hill International, Inc.	Construction Manager	469-242-4708	johnbonaparte@hillintl.com
Maureen Wakeman	Hill International, Inc.	Clerical Support Staff	215-801-5395	MaureenWakeman@hillintl.com
Dain Pankratz	Boyd Caton Group	Safety & Security/Rail Activation	909-560-5578	dpankratz@boydcatongroup.com
Arun Virginkar	Virginkar & Associates, Inc.	Vehicle Engineer	714-993-1000	virginkar.arun@va-inc.com
Willie O'Neal	Sol Engineering Services	QA/QC	601-961-1415	wonealjr@solengrs.com
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Appendix E

Operating Plan – Enhanced Bus Service

Appendix E – Operating Plan – Enhanced Bus Service

The information in this Appendix discusses the integration strategies for bus and rail services for each project segment:

- Operating Segment 1: West Side Stations and Guideway, includes nine stations. Passenger service is scheduled for 2022.
- Operating Segment 2: Airport Guideway and Stations extends service to another four stations in 2025.
- Operating Segment 3: City Center Guideway and Stations, extends service to another six stations, for a total of 19 stations, and is scheduled to begin service in 2031.

Plans for integration strategies for bus and rail services that involve the truncated FFGA scope, specifically bus services around the Civic Center and the downtown Honolulu stations, and the Pearl Highlands Parking Garage, are presented and discussed in Section 7 of the Recovery Plan.

The City's Department of Transportation Services (DTS) is ready to provide integrated bus service when passenger service commences on each Project segment.

DTS, in collaboration with HART, has prepared integrated multimodal transportation plans in preparation for passenger service on the rail system. The DTS Bus-Rail Integration Plan (BRIP) planning process continues to refine the future bus network described in the FEIS based on development patterns, employment, population, and travel characteristics, among other travel indications. This ongoing, comprehensive planning effort guides and informs future routing and fleet requirements. The information is used to determine the number of vehicles needed during peak periods and the type of vehicles assigned to each route. The plans include specific Bus-Rail Integration plans for the truncated FFGA scope.

Bus Rail Integration and Multimodal Planning

Bus rail integration and multimodal planning are ongoing. The planning process identified changes in the multimodal planning and implementation strategies to integrate bus, paratransit, park-and-ride, kiss-and-ride, bike, and walk access with rail as each Project segment is completed. Integrated multimodal transportation plans include detailed access to the modes listed. The plans identify at least one dedicated paratransit location for each station. This section identifies each Project segment and highlights station or other changes from the Revised Recovery Plan of 2018, in support of the truncated FFGA Scope.

Operating Segment 1 – East Kapolei to Aloha Stadium

Operating Segment 1 is a short-term opportunity to improve mobility within West and Central O'ahu. The existing bus service, including the neighborhood circulators, will be reconfigured to incorporate the nine rail stations. In Operating Segment 1, two all-day express routes will operate and feed the two termini with 10-minute peak and mid-day service. One provides premium service between the UH West

O'ahu Station and the East Kapolei Station, and continues through Kapolei, serving the Kapolei Transit Center. The second provides premium service from the Pearlridge Station and the Aloha Stadium Station to downtown, matching the rail headway with 10-minute peak and midday service.

Successful operation of this segment will enhance multimodal transportation on the island. Figure E-1 shows the connection of a new all-day express route serving East Kapolei Station and the neighboring UH West O'ahu Station. The Express route, Route 45, continues the high-capacity service through Kapolei ending at Kapolei Commons, and supplements an implemented hub and spoke bus system.

Major bus service increases will be implemented at the east-end terminus of Operating Segment 1 at the Aloha Stadium Station to support the 600-parking-space park-and-ride lot and bus transit center. Current peak-hour community circulator routes will be realigned, and service spans extended to support this station.

Bus service changes will include extended spans of service and increased frequency on existing routes. These services will include new frequent peak-hour expresses and a temporary all-day regional enhanced service, Route 55, between Aloha Stadium Station and major commuter destinations including Downtown shown in Figure E-2. These new services will operate until further rail extensions are opened for operations, at which time these services will cease.

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Figure E-1: Bus-Rail Integration – Kapolei and Makakilo

New and Modified Bus Routes

- 40 Modified to serve UHWO Park and Ride
- 41 Shortened to use Fort Barrette Rd instead of traveling through Villages of Kapolei
- 45 New high frequency route from UHWO Station to Kapolei Commons via Kamaaha Ave
- 416 Shorten route and discontinue service to Kapolei Commons
- 451 New Route to serve Makakilo and UHWO Station via Villages of Kapolei
- C Modified to serve Kapolei Pkwy and Kualakai Pkwy

Unaffected Routes

(Not all routes shown on map)

- Regular routes: 40, 411, 413, 414, 415
- Express routes: 92, 93, 94, 102

Rail Line

- Interim Opening Phase 1
- Rail Stations

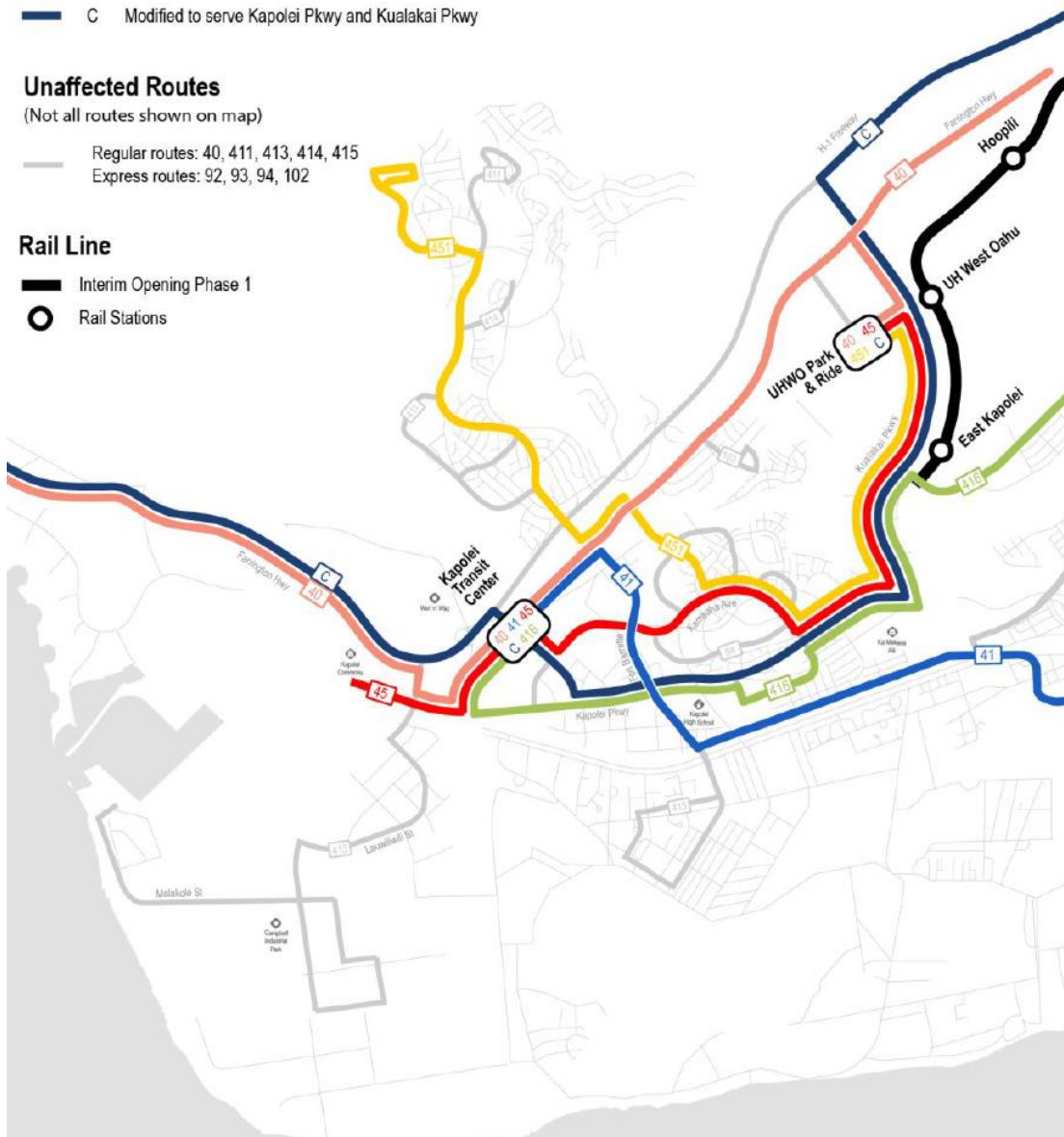


Figure E-2: Bus-Rail Integration – Pearl City and Aiea

New and Modified Bus Routes

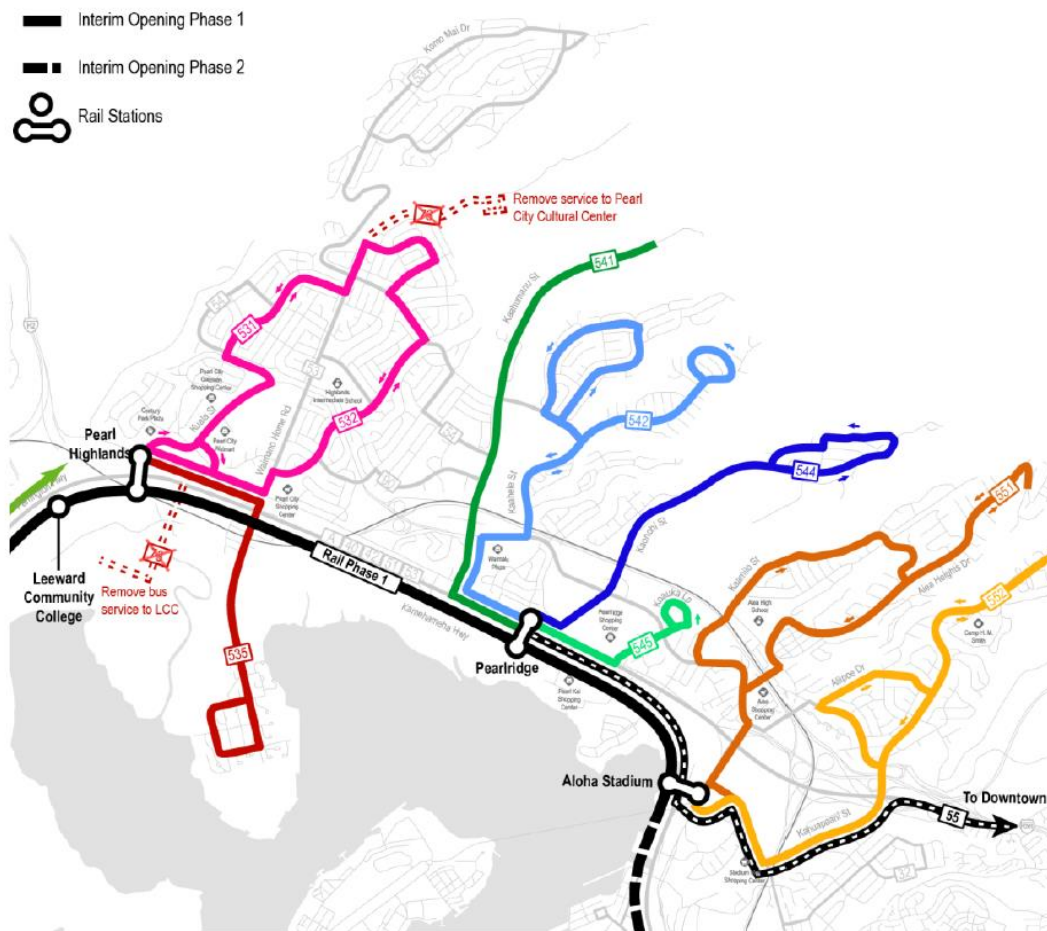
- 531/532 (new) Two-way circulator to Pearl Highlands Station.
- 535 (73) Pearl City Peninsula to Pearl Highlands Station.
- 541 (new) New service up Kaahumanu Street.
- 542 (71) Remove Kaahumanu Street service, add two-way service on Kaahele Street. Add weekend service.
- 544 (71) Add weekend service.
- 545 (new) New service to Koauka Loop.
- 551 (74) Add Kaamilo Street service.
- 552 (74) Add Aliipoe Drive service.
- 55 (new) New express service direct to Downtown from Aloha Stadium.

Rail Line

Interim Opening Phase 1

Interim Opening Phase 2

Rail Stations



Operating Segment 2 – Aloha Stadium Station to Middle Street Transit Center

Operating Segment 2 is expected to be completed in 2025 and will extend the rail system approximately five miles and four stations beyond Aloha Stadium to the Middle Street Transit Center via the Daniel K. Inouye International Airport. This is the Project's first entry into the urban core of Honolulu and provides the additional benefit of interfacing directly with the airport. Connecting bus networks will be adjusted accordingly during this phase but will not reach final major changes until Segment 3 is completed.

Operating Segment 3 – Middle Street Transit Center to the Civic Center Station

Under the truncated FFGA scope, the Civic Center Station will be the temporary terminus of the Project and the endpoint of Operating Segment 3. The opening of passenger service to the Civic Center Station will mark the opening of the entire 18.75-mile, 19-station rail system under the truncated scope. It will also represent the largest-scale implementation and revision of connecting bus and paratransit operations.

Peak-hour express routes, except those serving the Windward and East regions of O'ahu, will be scaled back and converted to high-frequency peak-hour services which interface with the rail alignment. This potential savings in bus operating expenses can be applied to creating better connections at all stations, emphasizing *mauka-to-makai* (inland to ocean) bus route alignments that connect at rail stations. All neighborhood community circulator connections in detailed station-based plans will be revised and adjusted according to the new projected demand for services.

In addition, DTS is currently conducting a comprehensive operations analysis to identify key transit corridors and prioritize capital projects that enhance multi-modal connectivity to future rail stations and major transit hubs. These projects will implement complimentary bus, paratransit, bicycle, and pedestrian infrastructure such as dedicated transit-only lanes, transit signal prioritization (TSP), on- and off-street multi-modal transit hubs, and multi-use paths. This infrastructure will focus on the following stations:

- Middle Street Station
- Iwilei Station
- Chinatown Station
- Downtown Station
- Civic Center Station

Appendix F

Ridership Forecasts

Appendix F: Ridership Forecasts

Executive Summary

The travel demand forecasting model estimates about 84,000 daily boardings for the truncated FFGA scope, approximately 16,600 boardings less than the estimated 100,610 daily boardings under the original FFGA scope, or a decline of 16.5 percent.

Despite the decrease in rail ridership, the truncated FFGA scope has a limited effect on overall corridor-wide mobility patterns. The truncated FFGA scope still serves 52 percent of the eastbound linked trips within the corridor that occur through downtown Honolulu. Another 38 percent of the linked trips are heading to points east of the Ala Moana Transit Center, and would still need to be completed by bus under either the original or the truncated FFGA scope.

Under the truncated FFGA scope, the Civic Center Station would become a major transfer hub for onward connections of new limited-stop, express routes to UH Mānoa and Waikīkī. Ridership at the Civic Center Station would increase almost threefold from 3,250 daily boardings to approximately 12,870 daily boardings. As a transfer point for trips along the corridor, however, the Civic Center Station can serve as an effective connection point.

Under the truncated FFGA scope, it is estimated that deferral of the Pearl Highlands Parking Garage would reduce the boardings at the Pearl Highlands Station by about 11 percent, while the estimated impact on overall rail ridership is a decline of only 1.7 percent. Approximately 70 percent of the eastbound rail passengers who are expected to use the parking garage live within 3 miles of the station and can be served by enhanced bus routes, new ride-sharing services, or enhanced connections to existing park-and-ride facilities. Bus-rail integration plans will be adjusted to adapt to these needs.

Background and History

In 2012, when the FFGA was signed, it was estimated that there would be 114,400 daily boardings for the rail transit system by 2030 (this estimate was based on a completion date of the rail system in 2020, an end-to-end running time of 44.3 minutes, a peak headway of 2.4 minutes and an off-peak headway of 4.7 minutes). Rail ridership forecasts were later updated when HART switched to fixed, four-car train sets, rather than two-car train sets, running at slightly longer headways. The travel demand forecasting model parameters were also updated to better differentiate rail from traditional bus services, and the entire model was converted to the TransCAD software platform.¹ Using this methodology, approximately 119,600 daily passengers were expected to use the system, or an increase of approximately 5 percent relative to the original FFGA forecast. Although these updated travel demand forecasts, from 2017 and later, are not directly comparable to previous forecasts due to the differences

¹ These new model parameters accounted for factors such as reliability, passenger amenities, increased seating, and schedule-free services.

in model input data and underlying computational methodology, the overall corridor-level estimates remained generally consistent with previous analyses.

The TransCAD travel demand model was subsequently recalibrated in the fall of 2020 to account for updated population and land use forecasts as well as national trends in declining transit ridership. In Honolulu, total daily transit (consisting of bus and HandiVan) boardings declined by about 16 percent between 2012 and 2019, or a decrease from 225,000 to 190,000 boardings. The model was recalibrated using 2019 transit boarding levels that were applied to the previous 2012 travel patterns. Note that the recalibrated estimates do not incorporate any of the short-term declines in ridership due to the COVID-19 pandemic that began in 2020.

The recalibrated model currently predicted 100,610 weekday daily rail boardings under the original FFGA scope, as shown in Table F-1. This was a decrease of almost 19,000 boardings relative to the previous four-car model estimates of 119,600 daily boardings, or about 16 percent.

Table F-1: Estimated Weekday Rail Boardings – Ala Moana Terminus, 2030: Original FFGA, Four-Car Model, and 2020 Recalibrated Model

	Original FFGA Forecast	2017 Model Update	2021 Model Update	Change, 2017 Update to 2021 Update	Percentage Change
Daily Rail Boardings	114,350	119,600	100,610	-18,990	-16%

Truncated FFGA Scope

To identify the transportation impacts associated with the truncated FFGA scope, several variables were adjusted within the travel demand forecasting model. These variables included the frequency of rail and bus services, the underlying feeder bus network, and the availability of park-and-ride facilities.

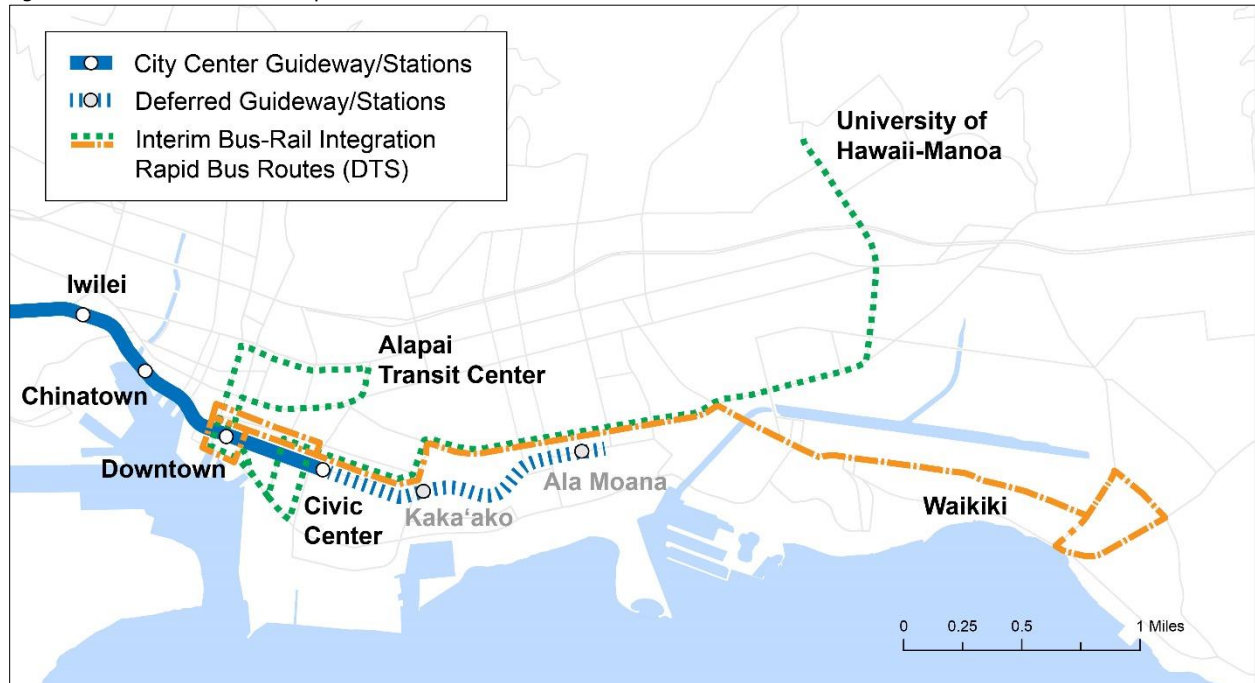
- Rail system headways were unchanged from the 2020 recalibrated model with trains arriving every 6 minutes during the peak period, and every 10 minutes during off-peak periods.
- The assumed feeder bus network was generally the same as in the original FFGA, except that new limited-stop services were added from the Downtown and Civic Center rail stations to UH Mānoa and Waikīkī. These new limited-stop routes were assumed to operate at headways that matched the rail services. Because these routes will overlap between downtown Honolulu and the Ala Moana Transit Center, the combined effective headway would have buses arriving 2 to 3-minute headway within this area. Slight adjustments were also made to other routes in the network.²

² The Haleiwa route (52) was modified to terminate at the Pearl Highlands Station while increasing the peak-period frequency from 30 minutes to 20 minutes, to provide more frequent service from existing park-and-ride lots in Wahiawa and Mililani Mauka. The Waikīkī local Route (8) was extended to the Civic Center Station to provide additional connectivity to the rail system. Route A and the conceptual 7X, which would have provided limited-services from UH-Manoa to Middle Street and Ala Moana Center, respectively, were eliminated (since these trips will be now served by rapid bus routes).

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- Finally, the Pearl Highlands Parking Garage was removed from the model.

Figure F-1: Truncated FFGA Scope with enhanced Bus Connections



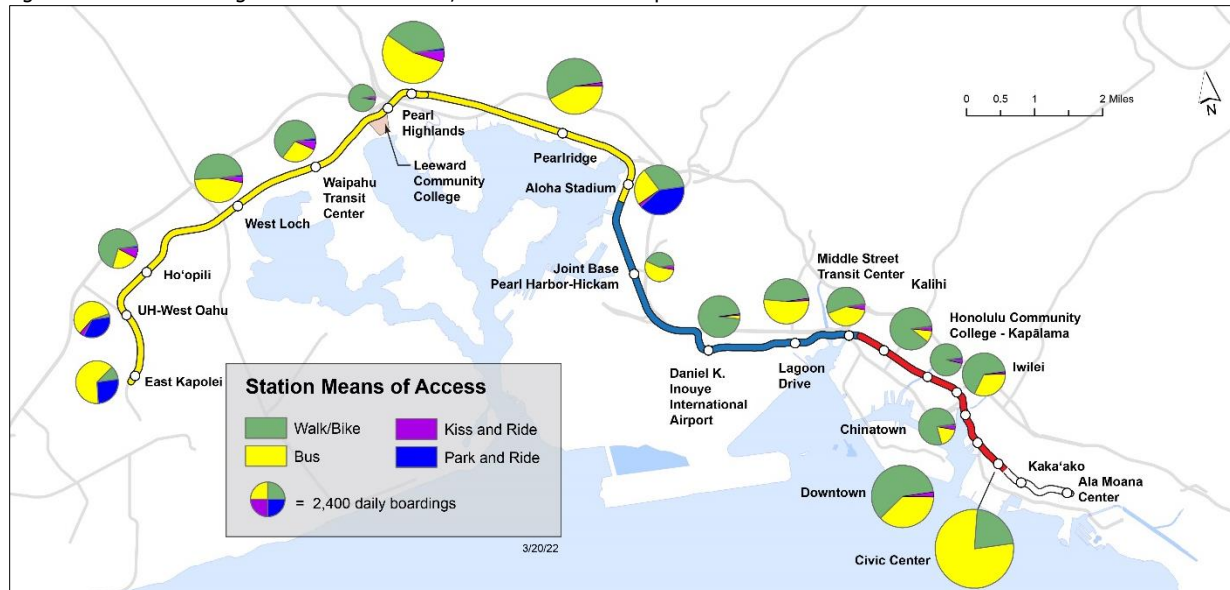
As shown in Table F-2, the new model estimates about 84,000 daily rail boardings for the truncated FFGA scope. This is about 16,600 boardings less than the original FFGA scope, or a decrease of 16.5 percent.

Table F-2: Comparison of Estimated Rail Boardings in the Original and Truncated FFGA Scope

	Original FFGA Scope	Truncated FFGA Scope	Change	Percent Change
Estimated Daily Rail Boardings	100,610	84,005	-16,605	-16.5%

Figure F-2 shows the relative number of boardings and means of access at each station under the truncated FFGA scope. The size of the circles illustrates the number of boardings, while the colors indicate the type of access to the station. The Pearl Highlands, Pearlridge, Downtown, and Civic Center Stations are the busiest stations.

Figure F-2: Rail Boardings and Mode of Access, Truncated FFGA Scope



Corridor Travel Patterns

Rail passenger boarding station to alighting station trip patterns were analyzed under the both the original and truncated FFGA scopes. The origin to destination trip patterns that included linked bus-rail connections were also analyzed to show the context of these differences within an integrated transit system.

Original FFGA Scope Travel

Table F-3 shows the boarding stations of the estimated 49,600 total daily eastbound rail passengers under the original FFGA scope. About 74 percent of these rail passengers were estimated to board at the first 13 stations of the project (from East Kapolei to Middle Street).

Table F-4 shows the estimated alighting stations of these eastbound passengers. About 30 percent of these passengers were expected to alight on the West side (between East Kapolei and Middle Street). Another 29 percent of the passengers were estimated to alight in Kalihi and downtown Honolulu. About 41 percent of all eastbound rail passengers were estimated to alight at the Kaka'ako or Ala Moana Stations under the original FFGA scope. Note that most of these passengers are heading to destinations further east (UH Mānoa or Waikiki), as will be seen in a subsequent analysis of linked bus-rail trips, which means these passengers would board a bus to their final destination under both the original FFGA scope and the truncated FFGA scope.

Table F-3: Boarding Station of Eastbound Rail Passengers – Original FFGA Project

	Eastbound Boardings by Station				
	Between East Kapolei and Middle Street Stations	Kalihi, Kapālama, and Iwilei Stations	Chinatown, Downtown, and Civic Center Stations	Kaka’ako and Ala Moana Stations	Total
Rail Boardings	36,470	5,605	6,660	865	49,600
Percentage	74%	11%	13%	2%	100%

Table F-4: Alighting Station of Eastbound Rail Passengers – Original FFGA Project

	Eastbound Alightings by Station				
	Between East Kapolei and Middle Street Stations	Kalihi, Kapālama or Iwilei Stations	Chinatown, Downtown or Civic Center Stations	Kaka’ako or Ala Moana Stations (and beyond via bus connections)	Total
Rail Alightings	14,870	4,360	9,805	20,565	49,600
Percentage	30%	9%	20%	41%	100%

Table F-5 shows the alighting stations of the 36,470 eastbound rail passengers, under the original FFGA scope, who originated west of or at Middle Street. Approximately 41 percent of those passengers were estimated to alight at another station on the West side. About 11 percent were estimated to alight in one of the three stations in Kalihi, while 22 percent were estimated to be headed to the Chinatown, Downtown, or Civic Center Stations. Only 26 percent of the rail passengers that originated west of Middle Street were estimated to alight at either the Kaka’ako or Ala Moana stations - and beyond via bus connections. This shows that the truncated FFGA scope will still directly serve about 74 percent of the rail passengers who would make the longest trips across the corridor from the West side.

Table F-5: Alighting Station of Eastbound Rail Passengers Originating West of or at Middle Street – Original FFGA Project

	Alighting Station				Total
	To or Between East Kapolei and Middle Street Stations	To Kalihi, Kapālama or Iwilei Stations	To Chinatown, Downtown or Civic Center Stations	To Kaka’ako or Ala Moana Stations (and beyond via bus connections)	
Boardings	14,870	4,105	7,915	9,580	36,470
Percentage	41%	11%	22%	26%	100%

To analyze this from a different perspective, Table F-6 presents the boarding stations of the estimated 20,565 eastbound rail passengers, under the original FFGA scope, which were expected to have alighted at either the Kakaʻako or Ala Moana stations. Approximately 47 percent of these passengers were estimated to board the system in one of the first 13 stations between East Kapolei and Middle Street. About 19 percent of the passengers were estimated to board the rail system in one of the Kalihi stations, while 30 percent were estimated to board at either the Chinatown, Downtown, or Civic Center stations. About 4 percent were estimated to be travelling from Kakaʻako to Ala Moana.

Table F-6: Boarding Stations of the Eastbound Rail Passengers Alighting at Kakaʻako or Ala Moana Stations– Original FFGA Project

	Boarding Station				
	East Kapolei to Middle Street Stations	Kalihi, Kapālama, or Iwilei Stations	Chinatown, Downtown, or Civic Center Stations	From Kakaʻako Station to Ala Moana Station	Total
Boardings	9,580	3,890	6,230	865	20,565
Percentage	47%	19%	30%	4%	100%

Table F-7: Destinations, Linked Bus-Rail Trips – Original FFGA

	Destinations of Linked Bus-Rail Trips				
	West Side, Kalihi, and Downtown	Ala Moana and Kakaʻako	To UH-Manoa area	To Waikīkī	Total
Trips	59,098	11,270	24,415	18,655	113,438
Percentage	52%	10%	22%	16%	100%

Table F-7 shows the estimated destinations of the eastbound combined bus and rail trips within the study corridor between Kapolei and UH Mānoa under the original FFGA scope. These are called linked trips, and include trips with a connection between rail and bus. Of the 113,438 eastbound trips, it was estimated that over 52 percent of the eastbound trips would have occurred through downtown Honolulu. Only about 10 percent of the trips would have had a final destination in Kakaʻako or Ala Moana. The remaining 38 percent of the trips would have had a final destination of UH Mānoa or Waikīkī. These trips would need to be completed via bus under either the original or truncated FFGA scope project. As such, the truncated FFGA scope has a minimal effect on overall corridor-wide mobility patterns.

Truncated FFGA Scope Travel Patterns

Table F-8 shows the origins of the estimated 41,650 eastbound rail passengers under the truncated FFGA scope, while Table F-9 shows the destinations of these passengers. About 85 percent of the rail passengers under the truncated FFGA scope would start on the west side.

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Table F-8: Boarding Station of Eastbound Rail Passengers by Area – Truncated FFGA Scope

	Origin			
	Between East Kapolei and Middle Street Stations	Kalihi, Kapālama, and Iwilei Stations	Chinatown and Downtown Stations	Total
Number of Rail Boardings	35,390	4,995	1,265	41,650
Percentage	85%	12%	3%	100%

Table F-9: Alighting Station of Eastbound Rail Passengers by Area – Truncated FFGA Scope

	Destination			
	UH-West Oahu to Middle Street Stations	Kalihi, Kapālama or Iwilei Stations	Chinatown, Downtown or Civic Center Stations	Total
Number of Rail Alightings	14,915	4,460	22,275	41,650
Percentage	36%	11%	53%	100%

Table F-10: Alighting Station of Eastbound Rail Passengers - Original and Truncated FFGA Scope

Alternative	Alighting Station				
	UH-West Oahu to Middle Street	Kalihi, Kapālama, and Iwilei	Chinatown, Downtown, and Civic Center	Kakaʻako and Ala Moana	Total
Original FFGA	14,870	4,360	9,805	20,565	49,600
Truncated FFGA Scope	14,915	4,460	22,275		41,650
Change	45	100	12,470	-20,565	-7,950
Percent Change	0%	2%	+127%	-100%	-16%

Table F-11: Boarding Station of Eastbound Rail Passengers - Original and Truncated FFGA Scope

Alternative	Boarding Station				
	UH-West Oahu to Middle Street	Kalihi, Kapālama, and Iwilei	Chinatown, Downtown, and Civic Center	Kakaʻako and Ala Moana	Total
Original FFGA	36,470	5,605	6,660	865	49,600
Truncated FFGA Scope	35,390	4,995	1,265		41,650
Change	(1,080)	(610)	(5,395)	(865)	(7,950)
Percent Change	-3%	-11%	-81%	-100%	-16%

Table F-10 compares the eastbound station-to-station ridership patterns between the original and truncated FFGA scopes, while Table F-11 compares the boarding stations. The truncated FFGA scope has a much greater effect on rail trips in the Kalihi and downtown Honolulu areas, with reductions in originating rail trips of 11 percent and 81 percent compared to the original FFGA scope, respectively.

Effects are also seen in the Pearl City-Aiea and Pearl Harbor-Airport areas. Table F-12 shows a breakdown in where these reduction in originating passengers occur.

Table F-12: Share in the Change in Number of Eastbound Originating Rail Passengers by Community, Original versus Truncated FFGA Scope

Origin	Change in Ridership, Original Versus Truncated FFGA Scopes	Share of impacts
West Oahu	95	-1%
Waipahu (Farrington Hwy)	(50)	1%
Pearl City - Aiea (Kamehameha Hwy)	(735)	9%
Pearl Harbor/Airport	(390)	5%
Kalihi - Iwilei	(610)	8%
Chinatown - Civic Center	(5,395)	68%
Kaka'ako / Ala Moana	(865)	11%
Total	(7,950)	100%

Table F-13: Destinations, Linked Bus-Rail Trips

	Eastbound Linked Bus-Rail Trips				
	West Side, Kalihi, and Downtown	Ala Moana and Kaka'ako	To UH Manoa area	To Waikīkī	Total
Current (2020)	29,240	5,601	17,712	13,050	65,603
Truncated FFGA Scope	58,518	9,268	23,458	17,780	109,024
Change	29,278	3,667	5,746	4,730	43,421
Percentage	100%	65%	32%	36%	66%

As shown in Table F-13, the truncated FFGA scope will still help to double the number trips by rail within the corridor through downtown Honolulu. The number of trips would increase by about 66 percent to the Ala Moana Transit Center and Kaka'ako and would increase by about 32 percent to UH Mānoa and Waikiki.

Civic Center Station

Under the truncated FFGA scope, the Civic Center Station would see substantially higher ridership and the addition of new bus-rail connections. Bus-rail connections will be a major factor in the operation of this station. Table F-14 shows 12,870 estimated daily boardings and 12,320 daily alightings at the Civic Center Station under the truncated FFGA scope. Table F-15 shows the means of onward egress from the Civic Center Station during the morning peak period, while Table F-16 shows the means of arriving at the station. An estimated 80 percent of passengers arriving by rail would continue onwards via bus in the eastward direction during the morning peak period. Conversely, an estimated 84 percent of the westbound rail passengers would arrive at the station via bus during the morning peak.

Table F-14: Comparison of Daily Boardings and Alightings at Civic Center Station - Original and Truncated FFGA Scope

	Total Daily Boardings	Total Daily Alightings
Original FFGA Project	3,250	3,495
Truncated FFGA Scope	12,870	12,320
Change	9,620	8,825
Percent Change	296%	253%

Table F-15: Means of Egress during AM Peak Period, Civic Center Station – Truncated FFGA Scope

	Walk	Onward Bus Connections	Total
Alightings	915	3,585	4,500
Percentage	20%	80%	100%

Table F-16: Means of Access during AM Peak Period, Civic Center Station – Truncated FFGA Scope

Means of Arrival at the Station	Walk	Arrival from Bus Connections	Total
Boardings	260	1,410	1,670
Percentage	16%	84%	100%

Table F-17 shows the final destinations of eastbound rail passengers who alight at the Civic Center Station during the morning peak period. About 32 percent of the passengers are destined for the downtown Honolulu or Kakaʻako areas, and would mostly continue via walking or biking. About 19 percent of the passengers are bound for either the Ala Moana or Moʻiliʻili area. About 19 percent would continue to UH Mānoa, while about 30 percent would continue to Waikīkī or beyond (including Kaimuki and East Honolulu).

About 46 percent of the eastbound rail passengers who alight at the Civic Center Station are going to destinations beyond Ala Moana, and these passengers would need to transfer to a connecting bus, regardless of where the transfer point is located.

Table F-17: Destination of Eastbound Rail Passengers Alighting at Civic Center Station, AM Peak Period – Truncated FFGA Scope

	Destination				Total
	Downtown/ Kakaʻako	Ala Moana/ Moʻiliʻili	UH Manoa/ Manoa	Waikīkī/ Kaimuki/ East Honolulu	
Journeys	1,523	885	819	1,273	4,501
Percentage	34%	20%	18%	28%	100%

Pearl Highlands Station

Table F-18: Boardings at the Pearl Highlands Station, Original and Truncated FFGA Scope

	Original FFGA Scope	Truncated FFGA Scope	Difference	Percent Difference
Total Daily Boardings	9,685	8,615	-1,070	-11%

Table F-18 compares the boardings at the Pearl Highlands Station with and without the parking garage under the original and truncated FFGA scope, respectively. The elimination of the parking garage is estimated to reduce the total number of boardings at that station by about 11 percent relative to the original FFGA scope. As shown in Table F-19, about 60 percent of the passengers utilizing this station would be accessing the station via bus under the truncated FFGA scope.

Table F-19: Mode of Access at the Pearl Highlands Station, Truncated FFGA Scope

	Walk	Bus	Drop Off	Formal Park-and- Ride	Informal Park-and- Ride	Total
Mode of Access	2,865	5,165	430	-	155	8,615
Percent	33%	60%	5%	0%	2%	100%

Sensitivity Tests

Several sensitivity tests were conducted to identify some of the key attributes of the travel demand forecasting model. Although these tests were conducted with an earlier version of the model, the overall patterns are similar.

Rail and Bus Services

Several scenarios were run with variations in the peak-period rail and connecting bus routes frequencies. Decreasing the rail and bus headways by 1 minute resulted in about 3,100 more rail boardings than the baseline alternative, or an increase in ridership by about 4 percent. Decreasing the rail and bus headways by another minute resulted in about 87,900 total rail boardings, or a 6,300 additional boardings over the baseline. Overall, every additional minute that the rail and bus headways were decreased produced over 3,000 more daily rail boardings.

Table F-20: Rail Boardings with Variations in Rail and Bus Supporting Bus Frequencies

	Baseline	Marginal Increase Scenario	High Rail Frequency with Baseline Bus Scenario	High Rail and Bus Frequency Scenario
Peak Rail Headways (minutes)	6	5	4	4
Peak Bus Headways (minutes)	6	5	6	4
Total Daily Rail Boardings	81,610	84,699	86,973	87,907
Increase Relative to Baseline	n/a	3,089	5,363	6,297
Percentage Increase Relative to Baseline	n/a	4%	7%	8%

Table F-20 shows the effect of the these feeder bus services on the overall model. To identify these effects, an additional model run was conducted that did not include the connecting express bus services from the Downtown and Civic Center Stations to UH Mānoa and Waikīkī and which had the feeder bus network assumed in the FFGA. This scenario had a estimated total rail ridership of 71,065 daily boardings, as compared to the 84,005 daily boardings in the scenario with the feeder routes as shown in Table F-21. As such, these two feeder routes were responsible for about 18.2 percent of the rail ridership, or an additional 12,940 passengers.

Table F-21: Total Daily Boardings with and without Feeder-Routes

Route	Civic Center Terminus No Feeder Routes	Civic Center Terminus with Feeder Routes	Difference	Percentage Change with Feeder Routes
Rail Boardings	71,065	84,005	12,940	18.2%

Effect of the Deferral of the Pearl Highlands Parking Garage

Another set of the truncated FFGA scope scenarios were run with and without the Pearl Highlands Parking Garage. The deferral of the Pearl Highlands Parking Garage reduces the overall rail system ridership by less than 2 percent relative to a scenario with the garage. This is equivalent to less than 1,500 boardings per day, as shown in Table F-22.

With the deferral of the Pearl Highlands Parking Garage, some of the formal park-and-ride demand gets shifted to other nearby facilities, but there is an estimated 21 percent reduction in the number of eastbound rail transit riders who will utilize formal park-and-ride options during the morning peak period. As shown in Table F-23, the eastbound park-and-ride demand is estimated to increase by 38 percent at the UH-West Oahu Station and by 41 percent at the Aloha Stadium Station with the deferral of the Pearl Highlands Parking Garage.

Table F-22: Total Rail Boardings with and without Pearl Highlands Parking Garage – Truncated FFGA Scope

	With Pearl Highlands Park-and-Ride	Without Pearl Highlands Park-and-Ride	Difference	Percent Difference
Total Daily Boardings	85,481	84,005	-1,476	-1.7%

Table F-23: Estimated Eastbound AM Peak Period Formal Park-and-Ride Demand with and without the Pearl Highlands Parking Garage – Truncated FFGA Scope

Station	With Pearl Highlands Parking Garage	Without Pearl Highlands Parking Garage	Difference	Percent Difference
East Kapolei	604	644	40	7%
UH-West Oahu	360	496	136	38%
Pearl Highlands	1,213		-1,213	-100%
Aloha Stadium	953	1,347	394	42%
Total	3,130	2,487	-643	-21%

A more detailed analysis of the travel demand forecasting model shows that a majority of the previously-expected eastbound users of the Pearl Highlands Parking Garage were originating in communities that are less than 3 miles from the station. Table F-24 lists the number of eastbound trips from each community that would have been expected to connect to the rail system at Pearl Highlands. The table also shows the approximate distance from the station, and how many trips would have used the parking garage or a connecting bus to get to the rail station. The number of trips that were originally expected to use the parking garage are summarized in Table F-25.

Overall, about 70 percent of all park-and-ride trips to the Pearl Highlands Station in the AM peak period were estimated to be made from communities under 3 miles from the station. These communities will be linked via circulator bus routes or shuttles to different rail stations along the corridor. In lieu of park-and-rides, access to these communities will be strengthened by more frequent bus service or other mobility options.

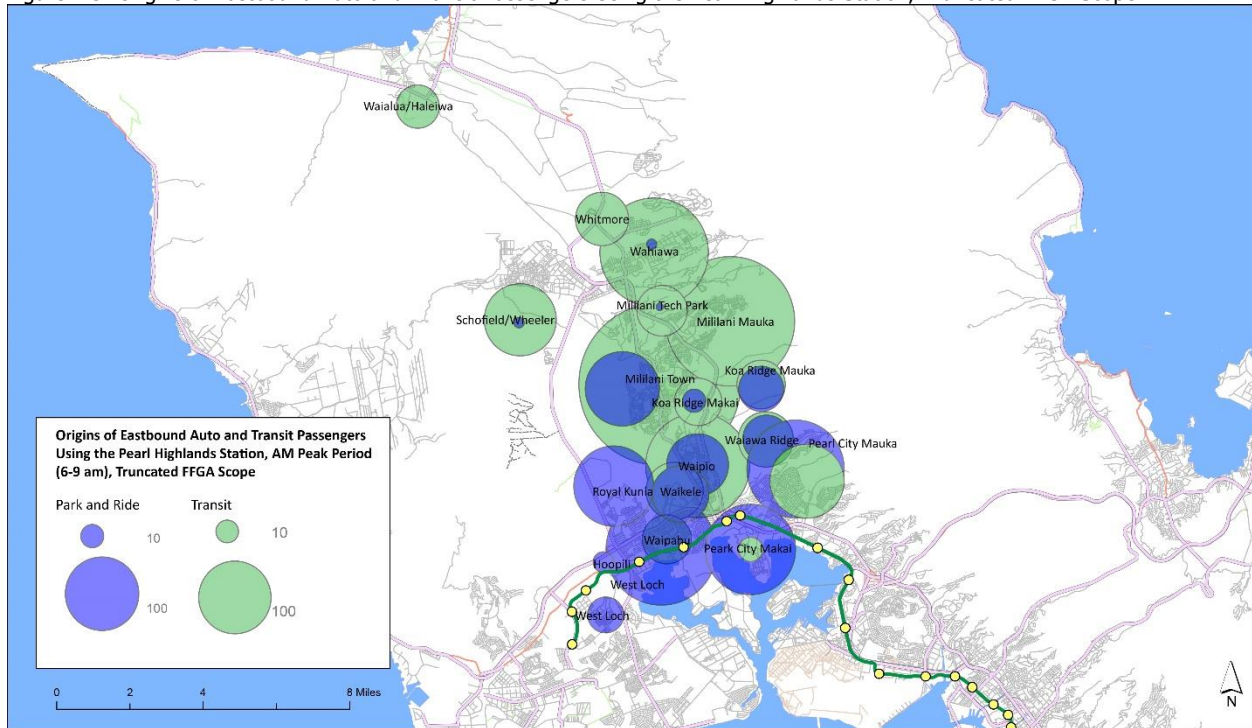
About 30 percent of the previously expected park-and-ride trips were estimated to be made from communities that are 3 to 5 miles from the station, including trips from Ho'opili, Royal Kunia, and Mililani. Park-and-ride trips from these communities will be better served by offering more frequent services and express bus routes. There are also existing park-and-ride lots in Mililani Mauka and Royal Kunia, Wahiawa, and Haleiwa, which will be connected to the rail system with more frequent connecting express bus services. It should be noted that there was a very limited number of riders who were estimated to drive between 5 and 8 miles to the Pearl Highlands Parking Garage.

The model utilizes a variety of demographic factors and travel time savings to estimate whether a commuter chooses to drive or take a bus to a rail station. Based on the model results, there would be minimal travel time benefits for commuters beyond 5 miles away from a rail station to park-and-ride rather than taking a bus from their home. It should be noted, however, that there is only limited

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experience with park-and-ride utilization for bus riders in Honolulu to date, and there is also no data on how far people would be willing to drive to a rail station.

Figure F-3: Origins of Eastbound Auto and Transit Passengers Using the Pearl Highlands Station, Truncated FFGA Scope



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Table F-24: Origins of Eastbound Passengers Connecting to Rail at Pearl Highlands Station by Mode and Approximate Distance from Station, Truncated FFGA Scope

Community	Number of Eastbound Trips by Originating Mode		Approximate Distance from Pearl Highlands Station			
	Park and Ride	Bus	Less Than 3 miles	3-5 Miles	5-8 Miles	More Than 8 Miles
Hoopili	9	0		x		
Koa Ridge Makai	12	50		x		
Koa Ridge Mauka	45	48		x		
Mililani Mauka	-	363			x	
Mililani Tech Park	1	60			x	
Mililani Town	102	554		x		
Pearl City (Makai of Kamehameha Hwy)	136	14	x			
Pearl City (Mauka of Kamehameha Hwy)	161	124	x			
Royal Kunia	109	0		x		
Schofield/Wheeler	3	110			x	
Wahiawa	-	227			x	
Waialua/Haleiwa	-	49				x
Waiawa Ridge	33	67	x			
Waikele	57	63	x			
Waipahu	238	50	x			
Waipio	68	246	x			
West Loch	19	0		x		
Whitmore	-	61				x
Total	992	2,086				

Table F-25: Approximate Number of Eastbound Park-and-Ride Trips by Distance from Pearl Highlands, AM Peak Period

	Approximate Distance from Pearl Highlands				Total
	< 3 Miles	3-5 Miles	5-8 Miles	More Than 8 Miles	
Park and Ride Trips	693	295	4	0	992
Percentage	70%	30%	0%	0%	100%

Appendix G – Operating Plan Annual Costs

Appendix G – Operating Plan Annual Costs

Introduction

Appendix G includes all operating cost categories of all public transportation modes operated by the Department of Transportation Services (DTS) of the City and County of Honolulu. It excludes any capital asset replacement or capitalization of preventative maintenance costs.

Correspondingly, it excludes any Federal funding that may be used for those purposes in the future. All content is consistent with the following documents that address capital asset replacement and the capital requirements needed to serve the trip demand forecasted by the Travel Demand Forecasting Model (TDFM) model runs:

Rail Operations and Management Plan, REV. 4, October 1, 2021.

Rail Fleet Management Plan, REV. 2.3, September 30, 2021.

Bus Fleet Management Plan, REV. 5.4, September 30, 2021.

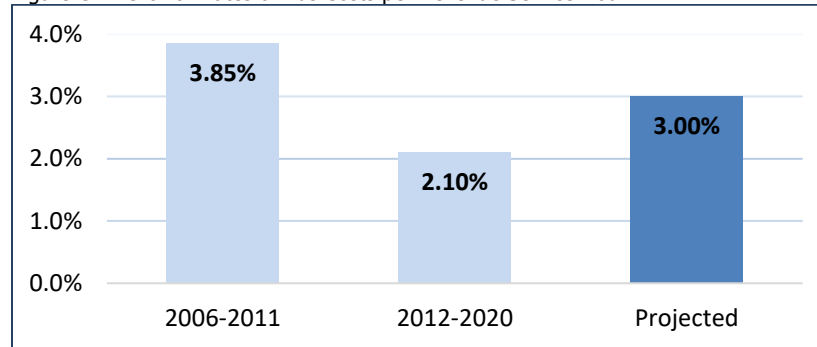
Rail Operations & Maintenance (O&M) annual costs have been updated based upon several fiscal years of knowledge gained from the preparation of annual budget requests approved by the Honolulu City Council. Those budget proposals included known future O&M cost obligations from the re-negotiated Hitachi Rail Honolulu Joint Venture (HRHJV) O&M contract executed in 2020.

TheBus, TheHandi-Van, and other City public transportation O&M cost projections are predominately based on recent National Transit Database (NTD) data experience over the past four reporting years noting the extraordinary circumstances of the 2020 and 2021 reporting years due to the COVID-19 pandemic. Reasonable assumptions are made to the degree possible given global unrest and other risk factors.

TheBus O&M costs were developed using existing bus operations as the baseline as well as anticipated service levels through FY2036. TheBus O&M costing methodology uses a resource build-up approach that fully allocates O&M costs based on total bus vehicle hours as the level-of-service variable.

Figure G-1 compares the inflationary growth factors cited in the original Financial Plan from 2006 to 2011 (3.85 percent), the updated average from 2012 to 2020 (2.10 percent), and the future annual average used in the updated projection (3.00 percent). The total cost per revenue service hour for bus operations was \$153.13 for the 2020 NTD reporting year.

Figure G-1: Growth Rates of Bus Costs per Revenue Service Hour



Paratransit O&M Costs

Paratransit, provided by the City, consists of three distinct components: TheHandi-Van, Supplemental Providers (taxi and other contracted private transportation carriers), and Agency-Provided services. TheHandi-Van provides most of the paratransit daily trips. Taxis and other carriers are contracted and scheduled through TheHandi-Van operation, and the use of these services has grown as trip demand has increased. Supplemental Providers must be certified to transport ADA-qualified passengers with wheelchair-lift equipped vehicles. The lack of wheelchair-lift vehicles can be a limiting factor in using Supplemental Providers. The last component is Agency-Provided services. These include human service agencies that provide the transportation for their ADA paratransit eligible clients, funded by the City. Agencies providing their clients transportation reduce the peak passenger trip demand for TheHandi-Van and give their clients needed transport to services.

TheHandi-Van experienced increasing demand in annual ridership through fiscal year (FY) 2019, portrayed in Figure G-2. Paratransit trips have increased each year from 980,000 in 2012 to 1,403,000 in 2019. These trips include those taken on TheHandi-Van, taxi and Human Service Agencies that are part of Supplemental Providers and Agency Providers supplementing TheHandi-Van.

During this same period between 2012 and 2019, operating costs increased from \$36 million in 2012 to \$60 million in 2019 as shown in Figure G-3. The projected O&M costs for paratransit are based on the FY +2019 cost per rider, equal to \$42.76, applied to the projected ridership, and adjusted for inflation.

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Figure G-2: TheHandi-Van Annual Unlinked Passenger Trips

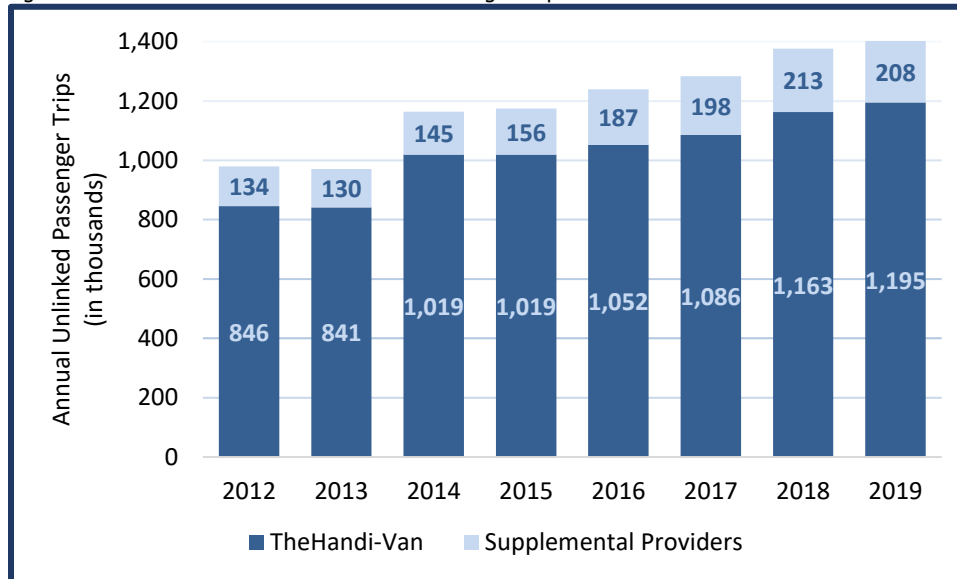
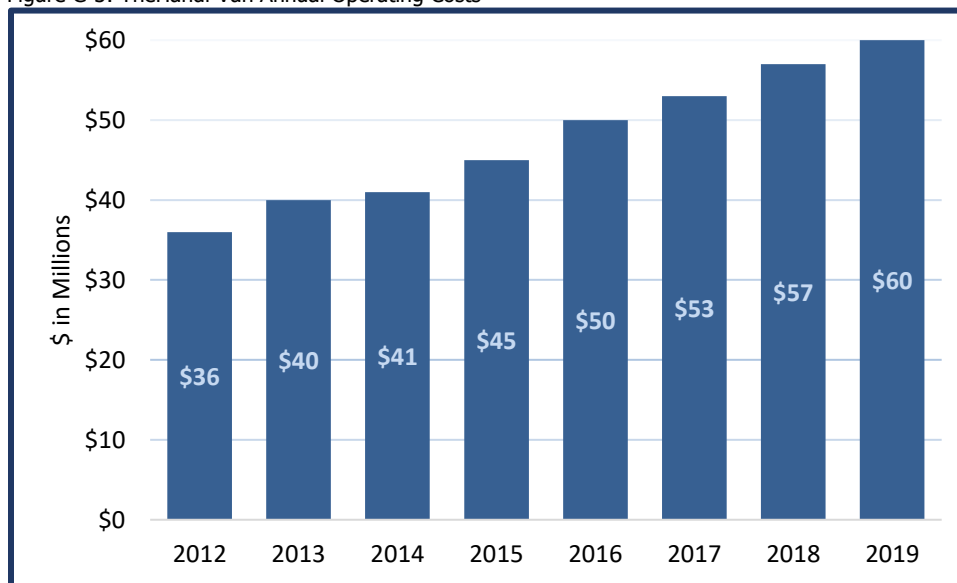


Figure G-3: TheHandi-Van Annual Operating Costs



Assumptions

The foundation of the Operating Plan Annual O&M Costs presented in Table G-1 is NTD data from the years 2017 to 2020. A workbook was prepared that includes the NTD data used; growth, index, and escalation factors; TDFM input forecasts; assumptions, and the formulations used to create Table G-1. The workbook cells identify the relationships amongst all the inputs and variables used to make the future year projections.

NTD data was used extensively to establish growth and productivity rates based on recent experience.

Operating revenues per unlinked bus transit trip over the past four NTD reporting years have increased each year as follows:

\$0.79 = TheBus Revenue Per Unlinked Passenger Trip in 2017

\$0.84 = TheBus Revenue Per Unlinked Passenger Trip in 2018

\$0.87 = TheBus Revenue Per Unlinked Passenger Trip in 2019

\$0.91 = TheBus Revenue Per Unlinked Passenger Trip in 2020

The above TheBus Revenue Per Unlinked Passenger Trip represents a 5 percent annual compounded growth rate. This is not just related to the base adult bus fare used in previous farebox revenue projections. It relates to a complex set of variables setting the stage for full deployment of the pre-paid electronic payment system, the Holo Card. Honolulu eliminated transfers, established a day pass, and undertook other fare category changes during the past five years.

In July 2022 other fare program increases and policy changes will be instituted which justify using the 5 percent Revenue Per Unlinked Passenger Trip growth rate into the future until the opening of rail to the interim terminus of the Civic Center Station under the truncated FFGA scope. At that time, it is assumed that unlinked passenger trips will increase, but not the revenue per unlinked passenger trip of the past because many Holo cardholders will be making more trips. Those trips per day will exceed the cap placed on the fare structure and thus will not contribute to additional fare revenue. Therefore, there is no Revenue Per Unlinked Passenger Trip growth rate assumed for the period 2032 to 2036.

TheHandi-Van and other public transportation revenue projections use a different methodology since TheHandi-Van fare has not increased in two decades. There is some support for increasing TheHandi-Van fare but that is largely offset by new fare concessions for those with low incomes who are offered deeply discounted fares. Therefore, the only revenue growth will be largely from the popularity of the low fare categories where current riders make more trips and new riders generate more revenue, but not on an increased revenue per unlinked passenger trip basis. Consequently, an assumed gross annual revenue of 5 percent is used based upon NTD historical revenue growth.

Table G-1 shows two other revenue sources: Federal Operating Assistance and Local Operating Assistance. Federal operating funds shown in the exhibit for the years 2017 through 2019 are from 5307 Capital Assistance Spent on Operations (including Maintenance). While these funds are available for operations, it is assumed that in future years the funds will be used for capital expenditure purchases. In 2020, most of the Federal funding used for operations, over \$17.6 million, came from the CARES Act Urbanized Area Program Funds (5307) an additional almost \$5.8 million was from the 5307 Capital Assistance Spent on Operations (including Maintenance).

Local Operating Assistance shows two categories: Transfer from Project and City Operating Subsidy. The "Transfer from Project" category is shown with no values as any transfer of remaining funds is not forecast at this time. The City Operating Subsidy is based on the difference between total Operating and Maintenance costs and revenues.

TheBus O&M cost projections are based on NTD Cost Per Revenue Vehicle Hour for the past four reporting years which are:

\$141.06 = TheBus O&M Cost Per Revenue Vehicle Hour in 2017

\$144.80 = TheBus O&M Cost Per Revenue Vehicle Hour in 2018

\$147.56 = TheBus O&M Cost Per Revenue Vehicle Hour in 2019

\$153.13 = TheBus O&M Cost Per Revenue Vehicle Hour in 2020

Over this NTD reporting period from 2017 to 2020 the growth in TheBus O&M Cost Per Revenue Vehicle Hour was an annual average of 2.8 percent. This should decrease over the next twenty years as the fleet transitions to sustainable propulsion systems which should require less maintenance. However, these cost savings are not established, and they could be offset by other unanticipated cost increases. Therefore, a conservative 3 percent growth rate in TheBus O&M Cost Per Revenue Vehicle Hour was assumed.

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Table G-1: Operating Plan Annual O&M Costs

City Fiscal Year	UNIT	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Operating Revenues																					
Fare Revenues (Bus and Rail)	YOE \$M	\$51	\$54	\$55	\$44	\$25	\$62	\$71	\$77	\$85	\$92	\$99	\$107	\$116	\$125	\$136	\$186	\$188	\$190	\$192	\$193
Fare Revenues (TheHandi-Van & Other)	YOE \$M	\$2	\$2	\$3	\$2	\$2	\$3	\$3	\$3	\$3	\$3	\$3	\$4	\$4	\$4	\$4	\$4	\$5	\$5	\$5	\$5
Total Fare Revenues	YOE \$M	\$54	\$56	\$57	\$47	\$27	\$65	\$74	\$80	\$88	\$95	\$102	\$111	\$120	\$129	\$140	\$190	\$192	\$194	\$197	\$199
Federal Operating Assistance																					
Total Federal Operating Assistance	YOE \$M	\$21	\$21	\$21	\$25	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Local Operating Assistance																					
Transfer from Project	YOE \$M	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
City Operating Subsidy	YOE \$M	\$173	\$183	\$191	\$207	\$237	\$244	\$347	\$366	\$379	\$383	\$407	\$414	\$421	\$454	\$479	\$449	\$469	\$488	\$496	\$516
Total Local Assistance	YOE \$M	\$173	\$183	\$191	\$207	\$237	\$244	\$347	\$366	\$379	\$383	\$407	\$414	\$421	\$454	\$479	\$449	\$469	\$488	\$496	\$516
Total Operating Revenues	YOE \$M	\$248	\$260	\$269	\$278	\$264	\$309	\$421	\$445	\$467	\$477	\$509	\$525	\$540	\$583	\$619	\$639	\$661	\$683	\$693	\$715
Operations and Maintenance (O&M) Costs																					
TheBus O&M Costs	YOE \$M	\$194	\$203	\$209	\$220	\$210	\$238	\$251	\$264	\$272	\$280	\$288	\$297	\$306	\$318	\$349	\$360	\$371	\$382	\$393	\$405
Rail O&M Costs	YOE \$M	\$0	\$0	\$0	\$0	\$0	\$0	\$96	\$103	\$112	\$110	\$128	\$129	\$130	\$154	\$153	\$156	\$160	\$163	\$153	\$155
TheHandi-Van O&M Costs	YOE \$M	\$48	\$50	\$53	\$53	\$52	\$64	\$68	\$72	\$76	\$81	\$86	\$91	\$97	\$103	\$109	\$115	\$122	\$130	\$138	\$146
Other O&M Costs	YOE \$M	\$6	\$7	\$7	\$6	\$2	\$7	\$7	\$7	\$7	\$7	\$7	\$7	\$7	\$8	\$8	\$8	\$8	\$8	\$8	\$9
Total O&M Costs	YOE \$M	\$248	\$260	\$269	\$278	\$264	\$309	\$421	\$445	\$467	\$477	\$509	\$525	\$540	\$583	\$619	\$639	\$661	\$683	\$693	\$715
Columns may not add due to rounding.																					
Farebox Recovery (Bus and Rail)		26.5	26.7	26.2	20.2	11.9	26.2	20.5	20.9	22.1	23.5	23.8	25.2	26.6	26.5	27.0	36.1	35.4	34.8	35.1	34.6

Operating Cost Risks

The intent of the following is not to identify all the operating risks but those that have a higher probability for Hawai'i given its geographical position and history.

Core Systems Contract

Approximately 54 percent of the rail O&M cost is fixed price under the Core Systems Design-Build Operate Maintain (DBOM) contract. The contract includes pricing for labor, materials, management, and administration, capital asset replacement, and bonding for rail O&M work. As such, the risks and uncertainties around cost are mitigated for the duration of the 13.25-year contract.

Cost Escalation

An escalation rate of 3 percent was applied to the Core Systems Contract and all TheBus and TheHandi-Van future year O&M costs even though the growth rate over the period from 2012 to 2020 was 2.1 percent for TheBus. The higher escalation rate was used due to worldwide uncertainty of future economic conditions. The previous level of disaggregation allowed for consideration of differences in the growth outlook for various cost items, such as labor, health care, or fuel prices, which may be expected to increase faster than general inflation.

Inflationary risks and uncertainties remain as the global and local supply/demand balance evolves. This is the case with energy costs in Honolulu, which are highly driven by oil prices and therefore are subject to its volatility. Hawai'i received almost a third of its oil imports from Russia per the U.S. Energy Information Administration before recent Federal actions to ban Russian oil imports.

Other Transportation Costs – TheBus and TheHandi-Van

The risks and uncertainties outlined above could lead to a higher level of O&M subsidy required to operate and maintain the City's public transportation system. TheBus operating subsidy (as measured by TheBus O&M cost minus TheBus fare revenues) is projected to grow as shown in Table G-1.

TheHandi-Van service levels are driven directly by ridership growth. The annual growth rate in TheHandi-Van ridership continues to be driven by the projected growth in the population above 65 years old assuming 70 percent of the growth.

Operating Revenues

Operating revenues or sources come primarily from passenger fares, Federal funding, and City revenues from the General Fund and Transportation Fund.

Passenger Fares

Public transit fares are set by the Honolulu City Council by ordinance. Current bus fares under Section 13-2.1 of the Revised Ordinances of Honolulu are shown in Table G-2. A November 2016 voter-approved amendment to the Honolulu City Charter established a Rate Commission to annually review and recommend adjustments to the bus, paratransit, and rail fares. The table details the history of City fare increases. The City will be raising fares effective July 2022.

Table G-2: TheBus Fare Structure and History

Effective Date	One-way Cash Fare		Monthly Pass	
	Adult	Youth	Adult	Youth
March 1, 1971	0.25	0.15	N/A	N/A
March 2, 1971	0.25	0.10	N/A	N/A
June 9, 1972	0.25, 0.50	0.10, 0.25	N/A	N/A
March 15, 1974	0.25	0.10	N/A	N/A
November 1, 1979	0.50	0.25	15.00	7.50
June 18, 1984	0.60	0.25	15.00	7.50
October 1, 1993	0.85	0.25	20.00	7.50
July 1, 1995	1.00	0.50	25.00	12.50
July 1, 2001	1.50	0.75	27.00	13.50
July 1, 2003	1.75	0.75	30.00	13.50
October 1, 2003	2.00	1.00	40.00	20.00
July 1, 2009	2.25	1.00	50.00	25.00
July 1, 2010	2.50	1.25	60.00	30.00
January 1, 2018	2.75	1.25	70.00	35.00
July 1, 2022	3.00	1.50	80.00	40.00

N/A = Not Applicable

Per Honolulu City Council Resolution No. 19-10, the fixed-route public transit farebox recovery ratio (FRR) should be maintained between 25 percent and 30 percent. The FY 2019 FRR was 26.2 percent per NTD reporting with TheBus operating expenses reported at \$209,029,213 and fare revenues providing \$54,693,193 of that revenue. Paratransit fares provided \$2,162,378.

DTS provides an opt-in discounted bus pass program called U-PASS for students at most universities and colleges on O'ahu. In addition, DTS has agreements with the University of Hawai'i at Mānoa and Hawai'i Pacific University where all students are assessed a mandatory fee that includes a pre-paid bus pass.

TheHandi-Van fare is \$2.00 per ride. The fare is payable by cash or ticket. Fare tickets are available at TheBus Pass Office at the Kalihi Transit Center. Tickets are sold for \$2.00 each. The last adjustment to TheHandi-Van fare was in 2001.

DTS introduced the HOLO Card program on TheBus in the summer of 2019. This is an account-based fare payment system allowing the user to store a cash amount, pass-value, or a fare and access it via tapping the card upon entry to the bus. Effective July 1, 2021, the HOLO card replaced the 1-day paper pass. In its place, the HOLO card is programmed with a daily fare capping function, meaning no rider will be charged more than \$5.50 in bus fares per day. Transfers are free using the HOLO card. After a fare is

paid with a HOLO card, no additional fares will be deducted for additional rides on the bus within 2.5 hours.

The HOLO Card will be used on TheBus, TheHandi-Van, and rail. Each HOLO card can be registered under the owner's name and loaded with funds to pay for their transit rides. The card can be loaded with funds online, at TheBus Pass Office, or select retailers. The convenience of a registered HOLO card account allows for balance protection against lost or stolen cards, reduces the need to keep track of paper passes, and can be automatically re-loaded when the customer runs out of funds. Even with the transition to the HOLO card, cash is still an accepted form of payment on TheBus.

Future Fares

Table I-3 illustrates TheBus and TheHandi-Van fare changes for FY 2022 and new changes being proposed by DTS. The transition to the Holo card allows for more sophistication in the fare structure at a reasonable administrative cost than was previously possible. Table G-3 identifies recommended fare increases for single rides and 7-day passes but with the benefit of having those increases capped at a daily maximum for frequent riders.

The green highlighted cells in Table G-3 contain those fare changes already authorized by the City ordinance. The orange highlighted cells are those fare changes being recommended. Modest fare increases reflecting Consumer Price Index (CPI) growth are expected in future years.

The recommendations include adding a residency requirement for deeply discounted fares (seniors, the disabled, and low-income), adding a higher fare category for non-residents, and adding a 7-day fare for resort areas. The intent is to monitor the revenue being received using the capabilities of Holo card data to assure the minimum FRR set by the City Council is achieved. The fare revenue projections in Table G-1 assume this policy is achieved.

Table G-3: Fare Category by Effective Dates for Fiscal Years 2021 and 2022

Fare Category	Resident Status	Effective 7/1/2021						Effective 7/1/2022					
		Period Pass or Fare Cap						Period Pass or Fare Cap					
		Cash or HOLO	HOLO Only	7-Day Pass	HOLO Card Only		HOLO Card Fee	Cash or HOLO	HOLO Card Only				
		Single Ride	Day Cap		Monthly Cap	Annual Cap		Single Ride	Day Cap	7-Day Pass	Month Cap	Annual Cap	
Adult Full Fare	No	\$2.75	\$5.50	\$26.00	\$70.00	\$770.00	\$3.00	\$3.00	\$6.00	\$28.80	\$80.00	\$880.00	
Youth	No	\$1.25	\$2.50	\$13.00	\$35.00	\$385.00	\$3.00	\$1.50	\$3.00	\$14.40	\$40.00	\$440.00	
Senior (Non-Hawaii Resident)	No	\$1.00	\$2.00	\$13.00	\$6.00	\$35.00	\$3.00	\$1.50	\$3.00	\$14.40	\$40.00	NONE	
Medicare HOLO Card	No	\$1.00	\$2.00		\$6.00	\$35.00	\$3.00	\$1.50	\$3.00		\$40.00	NONE	
Medicare Card Only (Bus Only)	No	\$1.00	\$2.00		\$6.00	\$35.00	\$3.00	\$1.50	NA		NA	NA	
Disabled	No	\$1.00	\$2.00		\$6.00	\$35.00	\$3.00	\$1.50	\$3.00		\$40.00	NONE	
Handi-Van Fare	No	2.00	NONE		NONE	NONE	\$3.00	2.25	NONE		NONE	NONE	
Senior (Hawaii Resident)	Yes	\$1.00	\$2.00		\$6.00	\$35.00	Free	\$1.25	\$3.00		\$6.00	\$45.00	
Disabled Fixed Route	Yes	\$1.00	\$2.00		\$6.00	\$35.00	1st Free	\$1.25	\$3.00		\$6.00	\$45.00	
Low-Income Fixed Route Fare	Yes	NONE	NONE		NONE	NONE	1st Free	\$1.25	\$3.00		\$6.00	\$45.00	
Low-Income Handi-Van	Yes	NONE	NONE		NONE	NONE	1st Free	\$2.00	NONE		NONE	NONE	
Transfer From Bus to Handi-Van		N.A.	N.A.		N.A.	N.A.	Free	Free	N.A.		N.A.	N.A.	
Low-Income Criteria		Not applicable						Low Income or SSI or Free School Lunch					
Institutional Pass Prices - Adult	N.A.	N.A.	N.A.		\$70.00	N.A.		N.A.	N.A.		\$80.00	N.A.	
Agency Coupons (Handi-Van)		2						\$4.00					

	Changes authorized by City Ordinances 87 or Ordinance 89
	New Changes Recommended by DTS

Operating Revenue Risks

Fare revenues are based on current demand forecasts for ridership and a continuation of current fare levels in real terms, which could both change due to several short-term and long-term factors such as the following:

- The state of the economy
- Local job markets
- Population growth
- Traffic congestion on roads and main highways
- Fuel prices
- Parking costs
- Land use and development plans

While the existing travel demand forecast has made some assumptions regarding each of these variables, there are uncertainties surrounding the timing and extent of each. The operating revenues assume periodic fare increases that would maintain an FRR for TheBus and rail between 25 percent and 30 percent, under the City's current policy. However, the FRR would not be met if fares are not increased.

The fare revenue forecast has not considered any temporary ridership decreases that could result from the fare increases based on previous experience demonstrating the relative inelasticity of the City's transit demand concerning fares. Furthermore, the fare revenue increases have been sized to continue the average passenger revenue per unlinked trip at approximately the same rate as has been achieved over the past three years before the pandemic. Accordingly, the fare increases should have a minimal

effect on ridership. However, any reduction in ridership because of the fare increases could lead to a lower FRR.

Federal Funds

Capital expenditures are funded using proceeds from City and County of Honolulu General Obligation (GO) Bonds and the following FTA programs:

- § 5307 Urbanized Area Formula Program
- § 5309 Fixed Guideway Modernization Program
- § 5309 Bus and Bus-Related Facilities Program
- § 5310 Enhanced Mobility for Seniors and Individuals with Disabilities
- § 5337 State of Good Repair
- § 5339 Bus and Bus Facilities Infrastructure Investment

The programs listed above are formula-based. In addition to these funds, FTA periodically releases discretionary grant programs. For example, two discretionary grants were published in February 2020. One, the Competitive Bus and Bus Facility Grant Program has a total of \$454.6 million available. In 2019, the average grant was \$5 million. The second grant program has \$8.9 billion available for the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Program. These grants are competitive, and funding is not guaranteed. DTS received additional funding through the CARES Act Coronavirus Relief Fund.

DTS makes every effort to apply for discretionary grants as they become available. Generally, both program and grant funds are 80 percent Federal dollars with a 20 percent local match requirement. DTS successfully received an award of Federal Fiscal Year (FFY) 2020 § 5339(c) Low or No Emission Grant Program funds. This grant has 50 percent Federal participation and will provide for the procurement of six battery-electric 40-foot vehicles. DTS will continue to compete for future Low-No grant awards.

Beyond the Project construction period, the Recovery Plan assumes that Section 5307 funds are distributed to fund ongoing system-wide capital expenditures; any remaining balance will then be used to fund preventive maintenance.

City Contribution

The City's contribution to rail O&M expenses is funded using local revenues from the General Fund, Highway, and Transportation Fund. The General Fund comprises most of its revenues from the following taxes:

- Real Property Tax: Tax on real property based on assessed value; rates vary with property class and are the major revenue source for the General Fund.
- State Transient Accommodations Tax (TAT): 7.3 percent tax on a dwelling that is occupied for less than 180 consecutive days. The City has historically received a portion of these revenues.

The State no longer distributes TAT funds to the counties. However, a new County-level TAT tax was authorized by the legislature and is the basis for this Recovery Plan.

- Public Service Company Tax: The City receives 1.9 percent of all public service companies' gross income.
- The Highway Fund comprises most of its revenues from the following taxes:
 - Fuel Tax: A 16.5 cent per gallon tax on all fuel sold or used within the City's jurisdiction is the major revenue source for the Highway Fund.
 - Vehicle Weight Tax: A tax on the net weight of all passenger and non-commercial vehicles (5 cents per pound), and motor vehicles and non-passenger-carrying vehicles (5.5 cents per pound).
 - Public Utility Franchise Tax: A 2.5 percent tax on all-electric power and gas companies' gross sales receipts.
- The Transportation Fund comprises most of its revenues, excluding transfers from the General and Highway Funds, from the following sources:
 - Fares: Bus, Handi-Van, and specialized transportation service fares make up the largest revenue source for Transportation other than transfers from other funds. These funds are used for the operations and maintenance of the multi-modal transportation system.
 - Fees and Charges for Services: These include parking fees for the Joint Traffic Management Center (JTMC) parking and OTS employee parking. JTMC parking revenues are used for the operation, maintenance, and improvement of the parking facility.
 - Miscellaneous Revenues: These include bus advertising, rental income, and other sources of funds. The recently enacted surcharge on loading zone permits for Waikīkī activities by ordinance is to be deposited into the Transportation Fund. Revenues from this source are to be used for the increased management and enforcement needs of the Waikīkī transportation management special improvement district.

Between fiscal years 2016 and 2020 the percent of the City's operating budget allocated to transit ranged steadily between 10.4 and 11.2 percent. In fiscal years 2021 and 2022 the percentage increased to 12.6 and 13.5 as the City began to budget for rail operations. This action by the Mayor and the City Council demonstrates the City's understanding and readiness to prioritize the necessary funding to operate and maintain the integrated system.

The FY 2022 operating budget included \$285.2 million for transit operations despite the bus and paratransit services experiencing a significant reduction in ridership during the COVID-19 pandemic. The City's projected operating resources for FY 2022 total \$3.49 billion although this amount reflects lower overall revenues and carryover due to the COVID-19 pandemic and resulting economic downturn. The

City's largest revenue source, real property taxes, is estimated at \$1.38 billion, or 39.1 percent of operating resources. This reflects a slight decrease in assessed valuations which are used to calculate tax revenues, compared to FY21.

Transportation revenues, such as the fuel tax and bus fare revenues, are higher compared to estimated FY 2021 revenues but are significantly lower than FY 2020 actual collections.

Increases in other transit revenue sources, such as advertising, concession contracts, and development opportunities, could reduce the amounts required to be transferred from the City's General Fund.